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## Spatial Proximity and Bodily Contact among the Central Kalahari San

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### ABSTRACT

Interpersonal spacing and bodily contact in public situations, were observed within the camps of the G/wi San. In an isolated camp composed of one family, the mother was in close proximity with all other members. In the mixed camps, the San were in far more frequent proximity with the same sex than with the opposite sex. The mode of distance between persons of the same sex was 0.1-0.3 m, while it was far longer between males and females other than ones' spouse. Of the body parts, the foot was most frequently involved in unintentional contact-states. Grooming behavior was usually performed by females toward juveniles or other females, while males never groomed females. The primary function of grooming toward juveniles was maternal care or reassurance, while between females, it functioned as a sociable transaction; particularly as a 'service' by the younger toward the elder. Males were in proximity with each other irrespective of kinship, while proximity and contact preferentially occurred between females, or between males and females of consanguineous kin. Proximity and physical contact were avoided between siblings or siblings-in-law of the opposite sex. Physical contact was strongly avoided between in-laws belonging to adjacent generations. However, proximity and contact generally occurred irrespective of the relationship between generations.

### INTRODUCTION

This study examines the interpersonal spacing and bodily contact among the Central Kalahari San hunter-gatherers inhabiting the Central Kalahari Game Reserve, Republic of Botswana. Human bodily or 'non-verbal' behavior has recently been given special attention to not only within the discipline of anthropology but also in other areas of behavioral science. The approaches to human bodily behavior range from kinesics (Birdwhistell, 1970) at one extreme, which mainly concerns itself with micro-cultural patternization of body motion, to human ethology at the other extreme, which puts special emphasis on the universality or the innateness of some aspects of human non-verbal behavior. The methodology of human ethology is especially relevant to this study. Blurton-Jones (1975) insists that although most anthropologists have been concerned only with the cultural variations in human behavior, the "cross-cultural constant" itself should be examined. He characterizes the basic attitude of the ethologists approach to the "cross-cultural constant" by such points as (a) starting with direct and simple data, (b) a distrust of interview data, and (c) application of a natural history approach before any construction or testing of the hypotheses. Furthermore he emphasizes the importance of the study of behavior in hunting-and-gathering societies in order to directly compare human behavioral characteristics with those of non-

human primates or other mammalian orders. The above argument supplies a primary theoretical groundwork for a series of recent ethological studies on the San (Bushmen).

Until recently, living in very marginal habitats, a fairly large population of San have been isolated from extensive contact with their agricultural and pastoral neighbors, sustaining an independent hunting-gathering subsistence (Lee, 1968). Thus, it can be expected that their original forms of hunter-gatherer behavior have not been drastically modified by peasant or pastoralist contact. Eible-Eibesfeldt (1972, 1974) has studied the development of aggressive gestures and territoriality among the !Ko San in the southwest area of Botswana. Konner (1976) has studied infant development and mother-child interaction of the !Kung San in northwestern Botswana. Blurton-Jones and Konner (1973) made a comparative study of the sex differences in behavior between London and San children. There are also studies of the economic constraints on children (Draper, 1976), child-training and teaching of non-aggression (Draper, 1978), and violence or murder among the !Kung San (Lee, 1979). These are not ethological studies in the strict sense, but are revealing as excellent natural historical descriptions of the everyday behavior of adults and children in San society.

In this paper, I am following the methodological issues proposed by Blurton-Jones (1975) as described above. However, this paper does not intent to abstract any innate program from the bodily behavior of the Central Kalahari San. I am in agreement with Blurton-Jones on the importance of an evolutionary perspective of the study of bodily behavior, especially of the hunter-gatherers. It seems to me that Birdwhistell's argument that every aspect of human behavior is determined by culture (Birdwhistell, 1970) is rather dogmatic. However, it is almost impossible to prove any behavioral characteristic to be innate or universal, based on the observation of only one ethnic group. The primary purpose of this paper is to elucidate behavioral tendencies or interpersonal attitudes of the Central Kalahari San, of which they themselves are usually unaware of, by analyzing the way of handling one's body in the presence of others. Furthermore, based on such behavioral tendency toward others, which may be specific to the San, I intend to re-examine the social organization of the San. Students of human ethology have paid little attention to the social context or organization of the social arena in which every behavior arises. In contrast, this paper makes much of the socio-ethological viewpoint and intends to articulate the natural history description of human behavior with the elucidation of the human social existence. The theoretical background for this viewpoint can be summarized as follows:

(a) The body is a common given to the human species. Therefore, if there are domains of social experience to which humans are subject, the experiences directly concerned with the body should form an essential framework of such a domain.

(b) When we recognize the 'social existence' of the human species, we are usually apt to refer to the institutionalized society accompanied with the differentiation of social role or status. However, the immediate 'society' we experience in everyday life is found in the face-to-face interaction with others (cf. Goffman, 1959).

(c) Lévi-Strauss (1967) claims that anthropology draws its originality from the unconscious nature of the collective phenomena. However, so far as the behavioral level is concerned, any collective phenomena is ultimately based in the individual. Therefore, the 'unconscious nature of the collective phenomena' should be understood in terms of the unconscious behavioral tendency of each individual toward others. The elucidation of the way of handling one's body in the presence of others should contribute to the understanding of the unconscious structure of the behavior and society among any ethnic group.

The interest in the elucidation of the conventional program of behavior which are not expressed explicitly with the actors knowledge, is shared by those engaged in the structural analysis of face-to-face interactions (Kendon, 1982). However, while the structural analysis of face-to-face interactions focuses on the microscopic aspects of body motion, fixed by audio-visual records, I have adopted an observation method of recording the behavioral items of a larger scale, which can be observed first hand. Generally, the microscopic aspects of body motion are difficult for the actor to intentionally control. On the other hand, macroscopic behavioral items which the actor always has to do are hardly subject to ceaseless control. Thus after a certain amount of data is obtained on such behavioral items, basic behavioral tendencies of the actor toward others can be elucidated. Interpersonal spacing, posture, and the direction of the body and gaze, can be regarded as large scale behavioral items from which the actor can never be exempted so far as he or she is participating in social encounters.

Hall (1966) coined the term 'proxemics' to designate the investigation of interpersonal spacing, and has shown that the organization and perception of interpersonal space is patterned in a specific way for each culture. There are many studies of interpersonal spacing, but few employ naturalistic observational methods (Burgess, 1983). So far as I know, no study has been done on the proxemic behavior among hunter-gatherer societies. In the discipline of the primate sociology and ethology, spatial proximity and physical contact also have been repeatedly made use of as one of the most valid and observable behavioral items representing affiliation or friendship (e.g., Takahata, 1982). Here, it should be sufficient to recognize that for both non-human primates and man, proximity and contact are the basic ways of face-to-face interaction with others. This determines not only the framework of the social encounter, but also the degree of "perceptual involvement" (Hall, 1966) in the encounter.

This paper, focusing on proximity and contact, is only the first step toward the elucidation of the forms of social existence of the San in terms of bodily interaction. The results of this paper shall be integrated into the analysis of other behavioral items such as posture and bodily direction in other reports of the San, in order to depict the entire aspect of face-to-face interaction with others. It is also necessary to describe the entire process by which the social encounter begins and unfolds, and to elucidate the implicit program or latent rules governing it. Such a methodology enables us to reconsider egalitarianism, from the perspective of the organization of everyday face-to-face interactions. This subject, however, is left for future investigations.

## MATERIAL AND METHODS

### (1) Research Area and Subject Group

Field research was carried out for approximately six months, from mid August 1982 to the middle of February 1983, in the #Kade area located in the mid western part of the Central Kalahari Game Reserve, Republic of Botswana (Fig. 1). Studies of ecological anthropology carried out by Tanaka (1971, 1976, 1978, 1980) and by Silberbauer (1972, 1981) on the San people living in this area. Since 1979, the government has prompted the people in the #Kade area to settle around the !Koi!kom borehole, 200 km away from Ghanzi (Tanaka, 1983). Since 1981 under the guidance of the Remote Area Development Office (RADO), the people living in Gyom, Metse-a-Manong, and Monatse have begun to migrate from their home lands to !Koi!kom. The population at !Koi!kom reached 530 in October of 1982 (Tanaka, 1983). The people settled in 16 camps around the borehole and have become dependent on the food (maize flour) supplied by

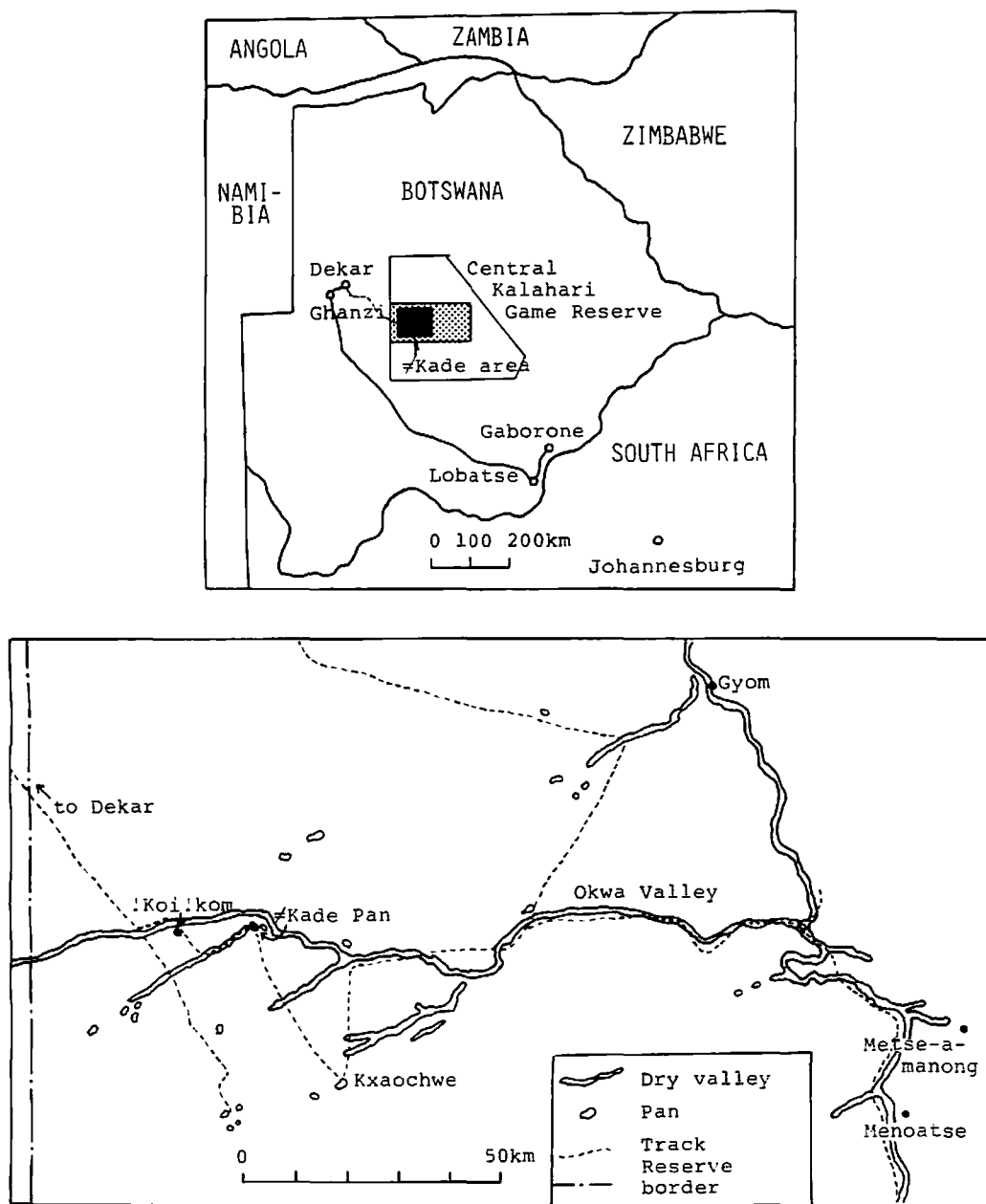


Fig. 1. Map of the Study area. The lower map was extracted and modified from the map of the Central Kalahari Game Reserve made by G. B. Silberbauer.

Table 1. Composition of each household in three G/wi camps

Camp	Household	Old		Adult		Adolescent		Juvenile/Infant		Total
		Male	Female	Male	Female	Male	Female	Male	Female	
V	A	<u>KM</u> -4	<u>be</u> -2	-	-	-	-	-	-	2
	B	-	-	-	<u>kk</u> -7	-	<u>ks</u> -16	2	-	4
	C	-	-	<u>AM</u>	<u>ha</u> -13	-	-	1	-	3
	D	<u>PR</u> -2	-	-	<u>kg</u> -10	<u>KI</u> -14	-	1	2	6
	E	-	<u>ki</u> -6	<u>NK</u> -5	-	<u>KT</u> -11	-	-	2	6
						<u>TB</u> -15				
Total		2	2	2	3	<u>3</u>	1	4	4	21
VI	F	-	-	<u>CH</u> -6	<u>ga</u> -11	-	-	5	-	7
	G	-	-	<u>KN</u> -9	<u>no</u> -14	-	-	2	1	5
	H	-	<u>go</u> -3	-	-	-	<u>km</u> -17	-	1	4
							<u>gu</u> -18			
	I	-	-	<u>GR</u> -7	<u>ko</u> -9	-	-	1	2	5
	J	<u>NS</u>	-	-	<u>kb</u> -8	-	-	-	2	4
	?	-	-	-	-	<u>HO</u> -13	-	1	2	4
	Total	1	1	3	4	<u>1</u>	2	9	8	29
VII	K	<u>KA</u> -3	<u>to</u> -1	-	-	-	-	-	2	5
			<u>ka</u> -5							
	L	-	-	<u>SH</u> -8	<u>da</u> -12	-	-	2	1	5
	M	-	-	<u>HX</u> -10	<u>kn</u> -15	-	-	1	1	4
	N	<u>OW</u> -1	<u>ts</u> -4	-	-	-	-	-	-	2
	?	-	-	-	-	<u>KR</u> -12	-	-	-	1
Total		2	3	2	2	<u>1</u>	0	3	4	17

Capital letters and small letters represent abbreviated names of males and females, respectively. Arabic numbers indicate the age order within each sex.

the government, and meat sporadically obtained by the group hunting on horseback (Tanaka et al., unpublished).

My subject group was composed of 66 individuals inhabiting 3 adjacent camps, about 1 km southeast of the borehole. Until 1979 the original main home range of this group was around Kxaochwe Pan, 50 km southeast of !Koi!kom (Tanaka, personal comm.). Table 1 shows, the abbreviated names of all individuals who have reached puberty and the number of children, for each household. The San in the #Kade area belong to 2 linguistic groups, G//ana and G/wi, which are closely related to each other. All the members of the subject group, except AM, NS, and da-12, belong to the G/wi linguistic group. As the people call themselves "G//anakwe" or "G/wikwe" ("Kwe" means 'person'), these terms are used in this paper to indicate each linguistic group.

Because the San number system only goes to three, it is difficult to estimate the absolute age of any individual. However, their accurate knowledge of birth order made it possible for all residents except NS and AM, who were identified with G//anakwe, to be ranked according to birth order. In addition to relative age order, all members were classified into 3 absolute age grades, i.e., old, adult, and adolescent.

## (2) Residence Pattern and Subsistence Basis

It has been clarified that the San camps are bilaterally organized (Tanaka, 1980; Lee 1979). It is also true for the kinship relation of the subject group. Figure 2 represents the genealogy for all members in the subject group excluding children. Three camps, V, VI, and VII, are composed of households A-E, F-J, and K-N, respectively. The core relative linkages of Camp V are the relations among brothers (PR-2 and NK-5) and their half sister (be-2). Similarly, the core linkages of camp VI are the relations between sisters (ga-11 and no-14) and those between their husbands who are also brothers. On the other hand, the core of camp VII is an extended family composed of parents and 2 married sons.

Even though the life at !Koi!kom is sedentary, the membership of the camp sometimes changes. In late August when the first census was carried out, households J and N lived elsewhere, but by late September they had moved into the peripheral parts of Camp VI and VII respectively. On the first census, the head of household C, AM, was found to live together with his first wife in Camp XIII locating at the northernmost part of !Koi!kom, and simultaneously his second wife, ha-13, who was approaching maternity lived in Camp II several hundred meters away from Camp V. Immediately after the delivery, this couple with the newborn baby had moved to Camp V. In addition, the second daughter

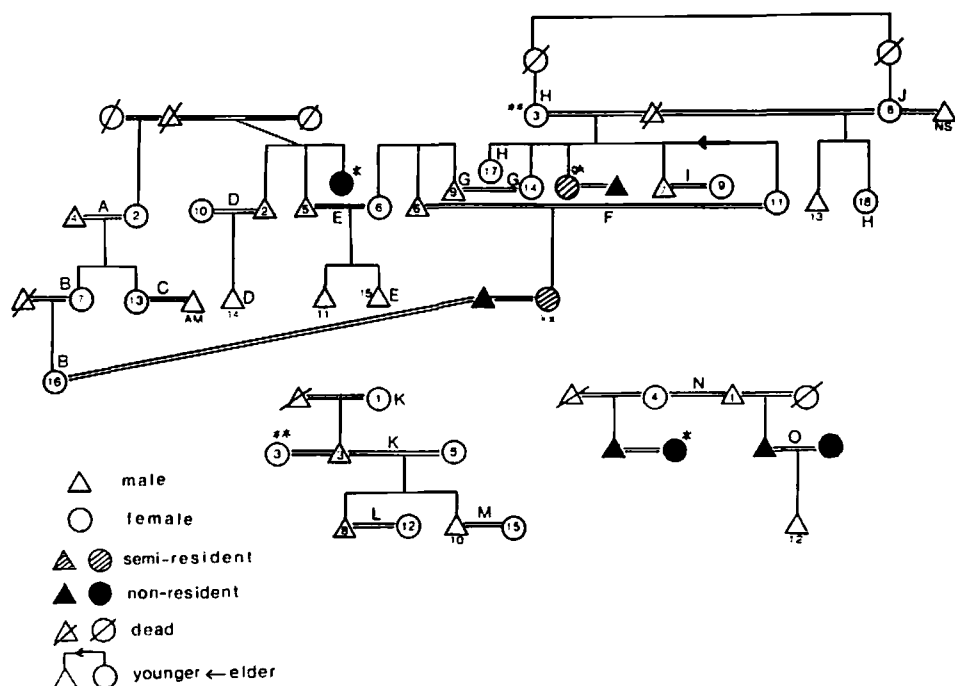


Fig. 2. Genealogy of mature and adolescent members of the subject group. Arabic figures indicate the relative age order of each individual shown in Table 1. Each of the single and double asterisks represents the same individual.

(gk) of go-11, a 'matriarch' of Camp VI, and her granddaughter (first daughter's daughter) (kx) were already married and living in other camps. They often came back to their home camp and lived together with their mother and sisters. These 2 women are categorized as 'semi-residents'.

In the #Kade area, the "G//anakwe have always been a more progressive group" (Childers *et al.*, 1982: p. 59), while the G/wikwe are more apt to adhere to traditional ways of life. Among the three camps of the subject group, the extended family of Camp VII possessed 2 horses, several donkeys, and more than 10 heads of goat. The 2 brothers (SH-8 and HX-10) of this group were frequently engaged in group hunting on horseback\*. In contrast, the level of material culture among Camps V and VI was almost the same as it had been 15 years ago when Tanaka began his investigation of the San in the #Kade area (Tanaka, 1971).

Figure 3 shows the residence pattern of the subject group during the research period. Since mid-October when the rainy season began, half of the members of Camp V and all the members of Camp VI migrated into the bush near #Kade Pan about 20 km from !Koi!kom. However, they stayed in the bush camps for only 2 weeks because RADO supplied the people with maize powder at !Koi!kom. During the stay around #Kade Pan they intensively gathered 3 species of wild plant food, 'lom/e' (*Cucumis kalahariensis*), 'kju:n' (*Ledebouria sp.*), and 'kware' (*Ledebouria sp.*) (Species identification is based on Tanaka, 1980). From early November to middle December, fields around !Koi!kom were cultivated and sown. From late December, many G/wi people began to migrate to Kxaochwe which had been their main home range. At first all the members of Camp VI, about a half of Camp VII, and several members of Camp V migrated to Kxaochwe A and joined a large hunting group composed of G//anakwe men, living together with them in the same camp. This composite group stayed at Kxaochwe for 24 days until the middle of January. From late December to the end of the research period (mid-February) a small family (J) separated from the rest of the group to live alone in an isolated camp near #Kade Pan. On the other hand, families D and E, which had remained at the sedentary camp, moved to a new campsite near the field about 1 km from Camp V in mid-January. In late January a second migration to Kxaochwe B started. All the members of Camp VI left !Koi!kom, and all but one family (I) formed a big camp in which 17 G/wikwe people from Camps II and IX joined. From late December to mid-February, people living around Kxaochwe intensively depended on 3 species of wild plant food, i.e., 'kxom' (*Grewia flava*), 'n//an' (*Citrullus lanatus*), and 'kan' (*Acanthosicyos naudiniana*).

### (3) Sampling Methods

Most of the observation was carried out within the sedentary camps at !Koi!kom. A short-term observation of household D was carried out for a week from October 29th to November 6th, in an isolated camp at #Kade. The camps at Kxaochwe A and B were observed for 2 days, (December 26th and 27th) and for 2 weeks from January 30th to February 12th, respectively. The observer participated in the group which included 2 or more mature or adolescent residents, which was formed in the shade within the camp in the daytime, and collected data by means of the following 5 sampling methods:

1) Focal Individual Sampling (Altmann, 1974): The following 4 items were recorded at 2 min. intervals for the randomly selected focal individual (adult or adolescent) and his or her 1st and 2nd closest adult neighbors and closest juvenile neighbor: (a) sitting or lying posture, (b) the minimum distances between the body of the focal individual and those of the 1st/2nd closest neighbors, (c) forms of bodily contact between the focal individual and the closest neighbors and the parts of the body contacted, (d) direction of the body. Focal individual sampling ranged from 15 to 60 minutes. In principle, the observer refrained from carrying out 2 or more sessions of



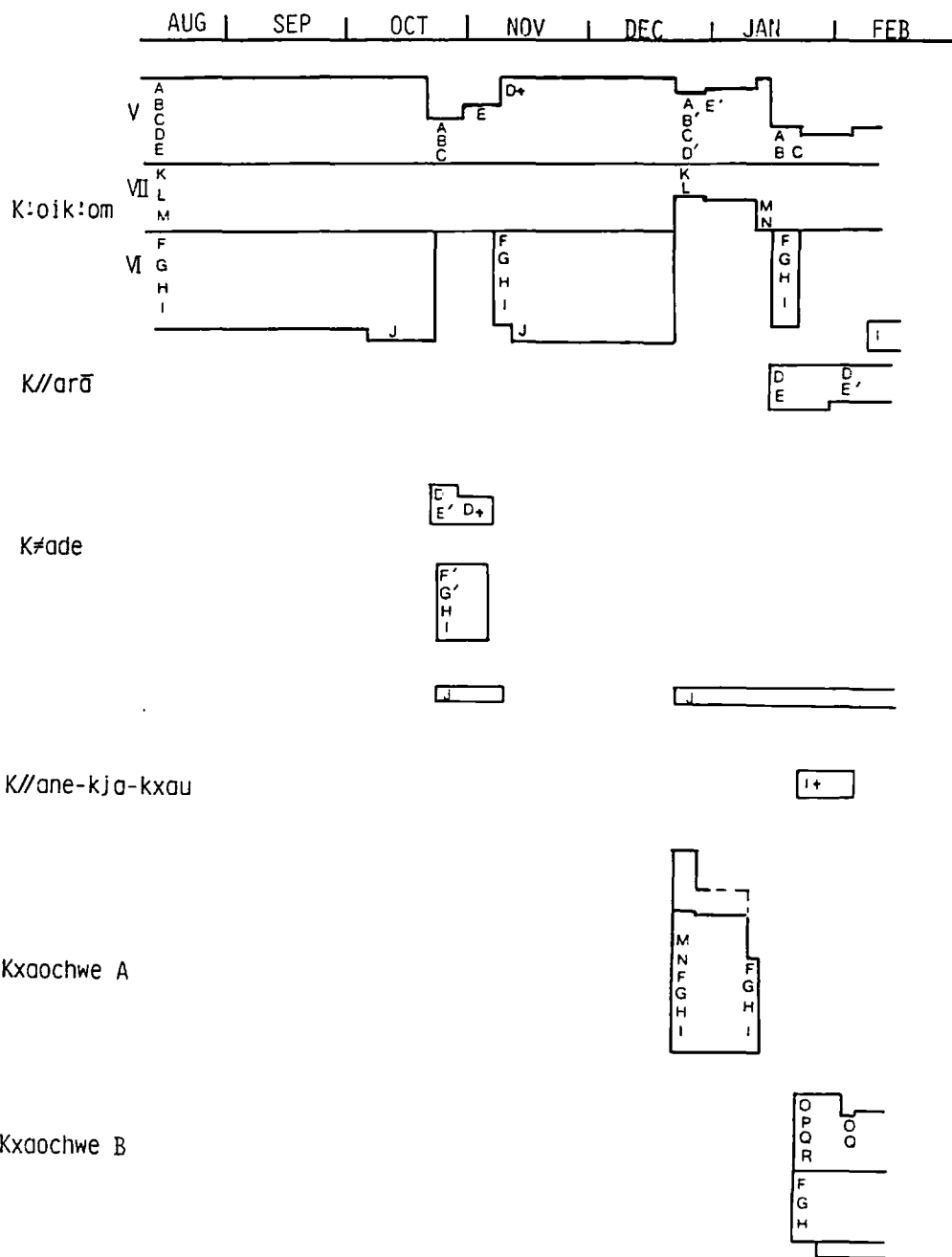


Fig. 3. Residence pattern of the subject group. Capital letters and roman figures indicate the names of households and those of sedentary camps, respectively. Capital letters with points indicate the households in which one or more members are absent. The names of places are given on the left side. 'K//ara:' means the field.

Table 2. Duration of focal individual sampling

Age grades	Male	Observation units	Female	Observation units
Old	<u>OW</u> -1	107	<u>to</u> -1	77
	<u>PR</u> -2	27	<u>be</u> -2	63
	<u>KA</u> -3	92	<u>go</u> -3	169
	<u>KM</u> -4	148	<u>ts</u> -4	0
	<u>NS</u>	0	<u>ka</u> -5	76
			<u>ki</u> -6	108
Adult	<u>NK</u> -5	140	<u>kk</u> -7	91
	<u>CH</u> -6	208	<u>kb</u> -8	27
	<u>GR</u> -7	40	<u>ko</u> -9	82
	<u>SH</u> -8	181	<u>kg</u> -10	72
	<u>KN</u> -9	174	<u>ga</u> -11	169
	<u>HX</u> -10	65	<u>da</u> -12	161
	<u>AM</u>	0	<u>ha</u> -13	177
			<u>no</u> -14	194
			<u>kn</u> -15	34
Adolescent	<u>KT</u> -11	51	<u>ks</u> -16	63
	<u>KR</u> -12	0	<u>km</u> -17	196
	<u>HO</u> -13	0	<u>gu</u> -18	167
	<u>KI</u> -14	65		
	<u>TB</u> -15	113		
Total	13	1411	17	1926

Observation units indicate the measurements at 2 min. interval. Total number of males or females indicates the number of all focal individuals.

focal individual sampling successively for the same grouping. Table 2 shows the number of focal sampling observation units for each resident. A total of 110 hours data were collected.

2) Grouping Sample: Before and after each session of focal individual sampling, the whole arrangement of participants in the group was sketched, and all the participants were identified.

3) Grooming Sample: All grooming behavior (picking off the lice) that occurred within the grouping were recorded. The performer (groomer) and the recipient (groomee) of this behavior were identified, and, if this behavior could be observed from initiation to termination, the duration in minutes was recorded.

4) Scanning Method (Altmann, 1974): Close proximity (within 0.6 m) and bodily contact were recorded at 2 min intervals among all the individuals within sight of the observer. This method was applied only to the 7 individual group in the isolated camp at #Kade.

5) Ad Lib Sampling (Altmann, 1974): Some kinds of social interactions especially attracting the observer's attention, i.e., greeting, sharing, interaction between adult and young, play fighting between adolescent or pubescent individuals, physical conflict between juveniles, and so on, were casually described.

In this paper, items (b) and (c) of focal individual samples, grooming samples, and the data obtained by the scanning method are analyzed. Other materials will be analyzed elsewhere.

#### INTERPERSONAL SPACING AMONG MEMBERS OF AN ISOLATED FAMILY

The present life style in the sedentary camps at !Koi!kom is very different from what it used to be for the San. Their lifestyle was based on a pure hunting and gathering economy in which changes of camp membership were frequent (Tanaka, 1971; 1980). According to Silberbauer (1981), the "band" of G/wi people usually split into small family units during the dry season, so that the people were very widely dispersed. Thus, the life in an isolated camp composed of only a few families had been an essential phase, lasting about one-third of every year, of the hunting-gathering life of the San.

For about a week from October 30th to November 6th of 1982, I observed the life of one family in an isolated camp near #Kade Pan. The interpersonal spacing among the members of this isolated family should be useful in reconstructing, and suggestive of the characteristics of proxemic behavior in the traditional dispersion phase during the dry season. Therefore the data for this isolated camp is analyzed separately in this section.

This isolated family (household D) had been living in Camp V at !Koi!kom. All the members are shown in Figure 4. Household D was composed of an elder male (PR-2), his wife (kg-10), their 1st son (KI-14) in adolescence, 2nd son about 12 years old (KAI), 2nd daughter about 5 years old (na)\*<sup>2</sup>, and their 3rd daughter about 2 years old (ho). In addition, an adolescent male (TB-15) the son of the younger brother of PR-2 also lived with the above members in this camp\*<sup>3</sup>.

Figure 5 represents the total hours for which each member left the camp, the average duration of absence per day, and the composition of groups leaving camp. The eldest male, PR-2, was out of camp the most hours per day. Furthermore, he left camp singly 80 % of the time observed. During this period, he dug up '!om/e' roots and set snares. On the other hand, it was 2 children (KAI and ho) who were out of camp for the least number of hours. The second son, KAI, sometimes went out with his father to inspect snares, while the second daughter, na, was with her mother 50 % of the total hours for which the mother was out of camp. In most instances the youngest child, ho, went out with her mother. The 2 adolescent males, KI-14 and TB-15, almost always left camp together. The ratio of 'going together' for each dyad is represented in Figure 6(a).

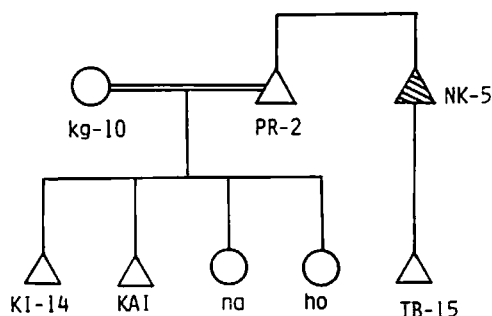


Fig. 4. Genealogy of all the members of an isolated camp at #Kade. The shadowed person didn't participate in this camp. See Table 1 for the abbreviated names of mature and adolescent individuals. KAI and na are juveniles, while ho is an infant.

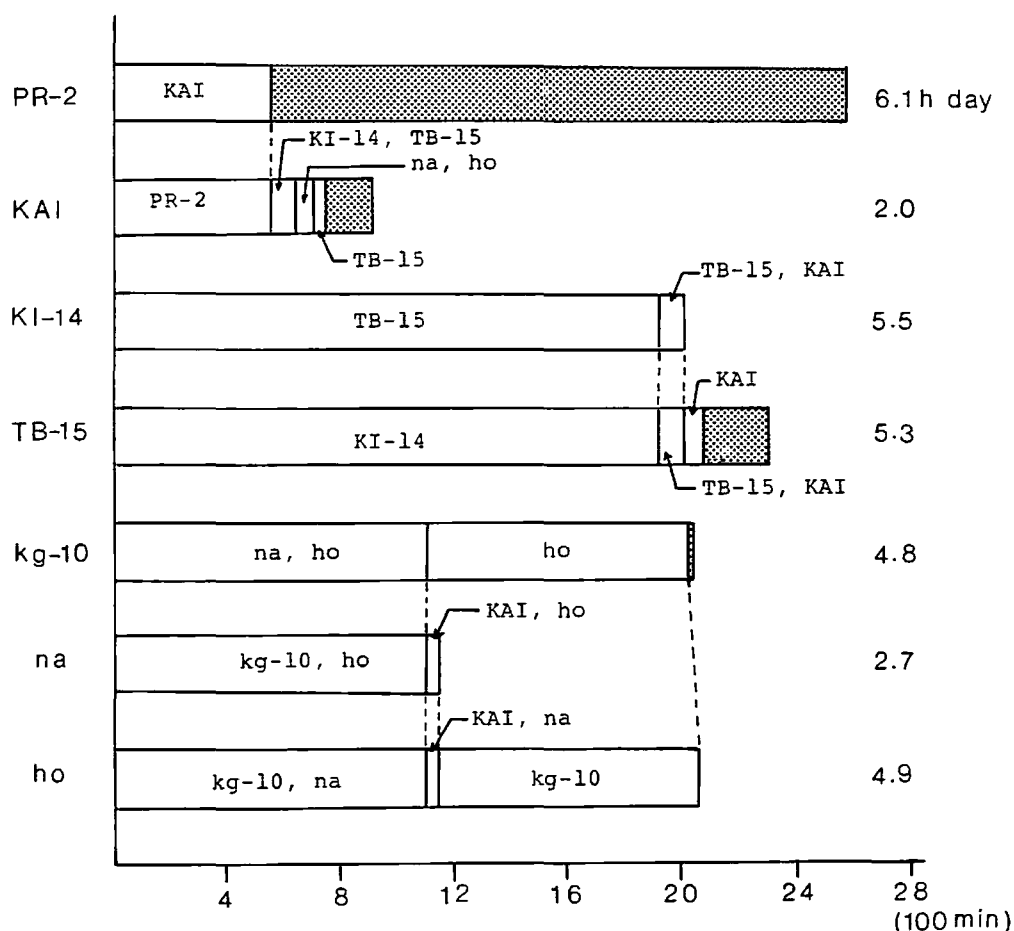


Fig. 5. Total hours for which each member of the isolated camp were out of the camp and the names of other members accompanying the individual. The shadowed bar indicates the hours for which each member went out singly. KI-14 had a shorter stay in this camp than the others.

As the duration for which respective members stayed within the camp varied, there was also a wide variation in the time duration for which respective dyads could be observed within the camp. Figure 6(b) presents the ratio (%) of observation units for which close proximity (within 0.6 m) or bodily contact were observed to occur in each dyad, to the total units for which the same dyad could be observed within the camp. This scheme is based on the measurements from total of 908 minutes.

The first feature of the structure of interpersonal spacing among the 7 members is that close proximity occurred in every dyad. The second feature to be noted is that the focus of this structure is an adult female, kg-10. Between kg-10 and all other members, close proximity occurred for more than 13

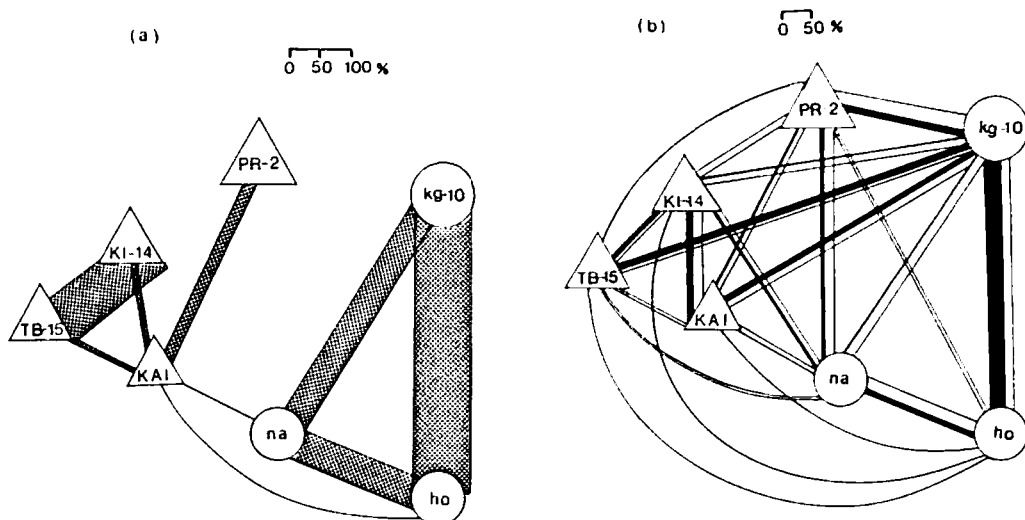


Fig. 6. Sociograms which represent (a) the ratio of individuals leaving camp together and (b) the ratios of being in close proximity (within 0.6 m) or in physical contact for each dyad of members of the isolated camp. In the sociogram (b) white bars indicate the ratio of being in close proximity and black bars indicate the ratio of being in physical contact. The ratio of going together for the dyad of members A and B,  $P(A, B)$ , is given by the following formula:  $P(A, B) = T(A, B) / (T(A) + (B) - T(A, B))$ . When T(A) and T(B) indicate the total hours for which A and B left camp, respectively, and T(A, B) indicates the hours for which A and B left together. The ratio of being in close proximity or in physical contact for the dyad of A and B is given by dividing the number of observation units for which A and B were in close proximity (or in physical contact) with each other by the total number of observation units for which the dyad of A and B could be observed to exist within the camp.

% of the total observable time for each dyad. Especially, very high levels of close proximity and contact were observed between kg-10 and her child (ho). This result is concordant with the general tendency reported by Konner (1976) and Lee (1979) stating that the San infants are in physical contact with their mothers for a very large portion of time.

The third feature of the whole structure of interpersonal spacing is that an adolescent male TB-15, the only member outside the nuclear family, occupies a rather isolated position with respect to the rest of the group. He was frequently in close proximity with only 2 members of the nuclear family, KI-15 and kg-10. KI-15 of almost the same age was the partner with whom TB-15 always left camp. Bodily contact between TB-15 and his aunt-in-law (kg-10), the highest frequency of close proximity between them, occurred in the form of grooming behavior performed by kg-10 toward TB-15.

Comparing the sociogram based on the ratio of 'leaving together' with that of spatial proximity within the camp, it is to be noted that the wife and the husband, who never left camp together, were involved in very frequent close proximity with each other within the camp. In contrast, the father and

the son (KAI), were in infrequent proximity with each other, although they sometimes left camp with each other. Reversely, between the father and the daughter, who had never left camp together, frequent proximity and some forms of bodily contact were observed within the camp.

Re-examining only the bodily contact represented by the sociogram of Fig. 6(b), the following 2 points are to be noted:

- 1) The frequencies of contact between the father and his 2 sons, or between the uncle and the nephew, were very low. This result might reflect the general tendency to avoid physical contact with those of adjacent generations.
- 2) The frequency of contact between the mother and the 2nd youngest child (na) was very low. This may be due to the competition between the 2nd youngest and the youngest child for contact with their mother.

Lee (1979) tells about the serious trauma from which the !Kung children suffer when they are forced to be weaned too early, as the result of short birth intervals. Although the shortage of the 2nd youngest girl's physical contact with her mother seems to be compensated to some extent by contact with her father, this girl had often shown idiosyncratic behavior which indicated her frustration. The characteristics of social interaction between adult and juvenile among the San will be discussed elsewhere. Here it is sufficient to point out that such behavior displaying irritation peculiar to the '2nd youngest child' was often observed within other families.

#### INTERPERSONAL SPACING AND BODILY CONTACT WITHIN THE MIXED CAMP

In this section, the extent to which individuals are in proximity with each other and the type of physical contact in situations where several families coexist in the same camp, or adjacent camps, will be elucidated. These results are based on the data obtained from observations in sedentary camps at !Koi!kom or in camps at Kxaochwe.

##### (1) Spatial Proximity

Figure 7 shows the frequency distribution of minimum distances between old or adult focal individuals and their 2 closest neighbors. In this analysis, 1st and 2nd closest neighbors are not distinguished from each other. Both old and adult focal individuals show a consistent tendency to be proximate far more frequently with the same sex than with the opposite sex. Furthermore, when an individual is proximate with the same sex person, the distribution curve shows a conspicuous high peak at distances of 0.1-0.3 m. Although the mode of distance between the focal individual and opposite sex neighbors is also 0.1-0.3 m, this distribution curve tends to be bimodal.

Based on the observations of interpersonal spacing among North-west coast middle class Americans, Hall (1966) classified the interpersonal distances into 4 zones, i.e., intimate, personal, social, and public distances. According to this classification, the mode of interpersonal distance, between 0.1-0.3 m among the San corresponds to Hall's distant phase in intimate distance zone (6-18 inches). Hall maintains that the intimate distance, where the bodily contact is most probable to occur, is regarded as inappropriate in public by middle class Americans. In light of Japanese everyday experience, the interindividual distance of 0.1-0.3 m kept by most San is extremely short. However, although it is evident that the San like to be closer together than do most Euro-Americans or, Japanese, one provision should be added to the absolute value of interpersonal distances among the San. That is, there is a clear difference in the degree of involvement between occasions when one's head-trunk is at the distance of, say, 0.3 m from another's head-trunk and occasions when one's extremities (eg. feet) are at the same distance from those of another. I measured the minimum distances

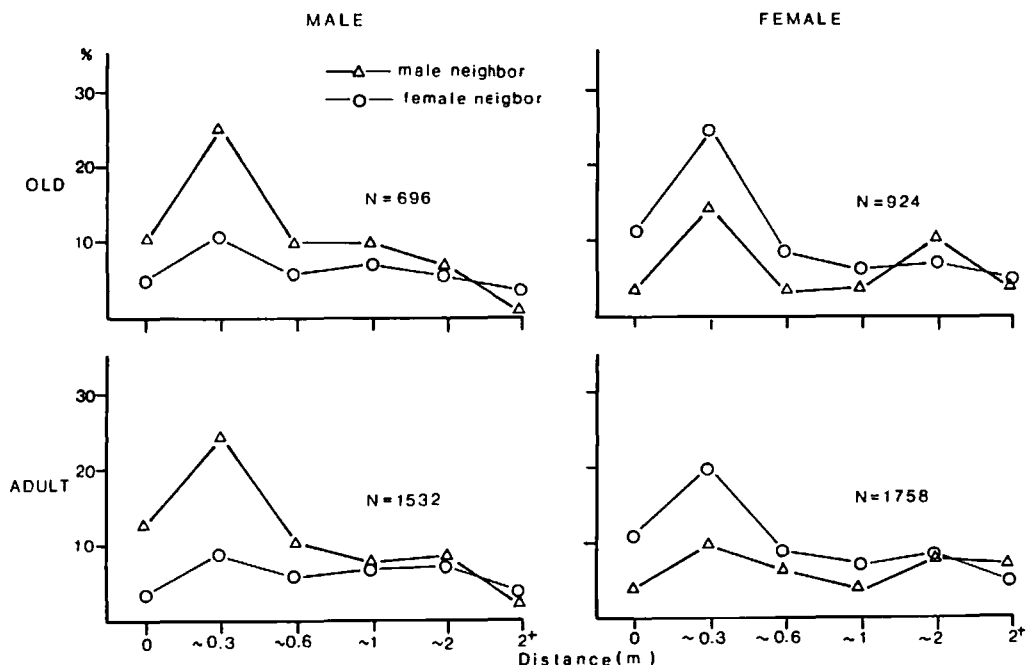


Fig. 7. Frequency distributions of the distances between the old or adult focal individuals and their 1st and 2nd closest neighbors. The 1st and 2nd closest neighbors are not distinguished from each other and the frequencies of the observation units for which the neighbors of each sex appeared at each of the 6 grades of distance are summed up together. N is the total number of these frequencies for all focal individuals of each age grade.

between two persons, without distinguishing the parts of the body in proximity. Therefore, if only the distances between the head-trunks had been measured, it is probable that the distribution of interpersonal distances among the San would have a different mode.

In order to further clarify the characteristics of proxemic behavior between male and female, the neighbors of the opposite sex are divided into spouse and other individuals (Fig. 8). Evidently, the spouse greatly contributes to the extremely close proximity (within 0.3 m) while opposite sex persons other than ones spouse tends to be at a greater distance (more than 1 m or so) from the focal individuals. Old females are the only exception. Namely, old females are frequently proximate with males other than their husbands at such short distances as 0.1-0.3 m, as well as with their husbands. This result is mainly due to one old female, ki-6, who was frequently in proximity with her adolescent son and her husband's elder brother's son also in adolescence. Thus, this tendency can be attributed to the bias caused by small sample size.

Figure 9 shows the frequency distribution of minimum distances between adolescent focal individuals and their 1st and 2nd closest neighbors. It is to be noted that the frequency of body contact with the same sex (distance=0 m) is extremely high for both adolescent males and females, while the

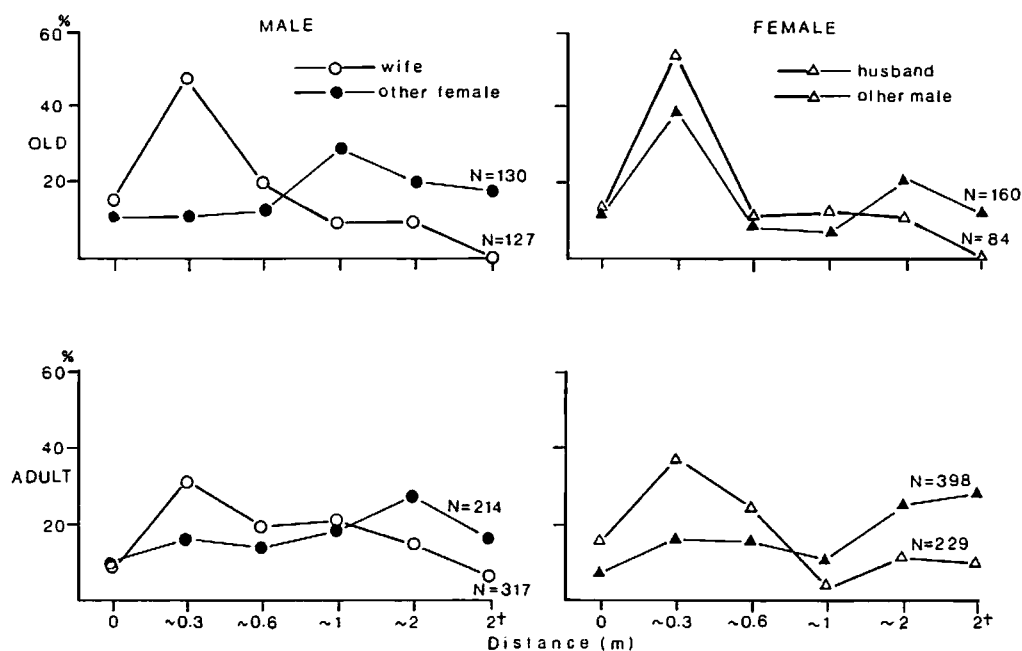


Fig. 8. Frequency distributions of distances between old or adult focal individuals and their spouses or other neighbors of the opposite sex. The focal individuals whose spouses have died are excluded from the data.

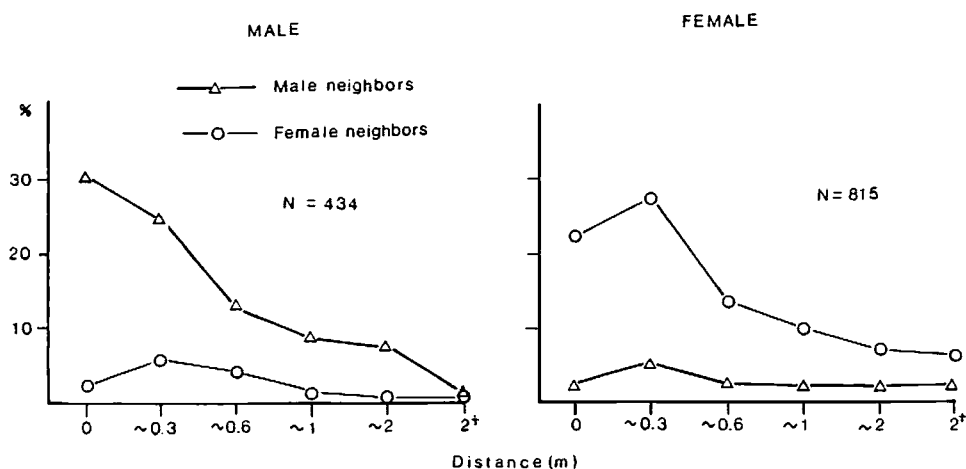


Fig. 9. Frequency distributions of distances between adolescent focal individuals and their 1st and 2nd closest neighbors.



proximity frequency with opposite sex individuals is very low. For example the mode of the distance between adolescent males and their male neighbors is 0 m (=contact). In other words, the characteristic of proxemic behavior among adolescent San is an extremely strong tendency to be proximate with the same sex and, reversely, to avoid close proximity with the opposite sex.

The above results do not necessarily mean that San adolescents always behave in a constrained manner toward the opposite sex of the same age. In fact, adolescent males and females sometimes enjoy 'play fighting' in which a male holds the wrist of a female trying to pull her down to the ground while the female cheerfully curses him. Adolescent girls or young married women sometimes chase and strike with a stick adolescent males who have bantered them. Such play fighting seems to be ritualized to some extent and afford unmarried men and women a capital chance to intimately come into contact with each other.

## (2) Contact-State

Anyone spending time with the San might be most deeply impressed with how close they like to sit with each other and how much physical contact occurs (Marshall, 1976; Draper, 1976). In the above section the data for spatial proximity has shown that the adult and adolescent residents of the subject group were in physical contact with other persons at a rather high rate. Namely, they are in contact with other persons for about 10 to 30 % of the time they are all gathered together in the shade during the daytime\*. In this section, such contact-states will be analyzed.

With the term 'contact-state', I refer to the state in which any parts of 2 persons' bodies are unintentionally in contact with each other. Thus, intentional contact behavior such as grooming (picking off lice), pulling out a thorn, caressing, and play fighting, are excluded from the contact-state, (though these contact behaviors are also included in the grade of 0 m distance in the Figures 7-9).

The relative frequencies of each part of the body is schematized in Figure 10, based on the cases where it could be ascertained which part of the body was involved in the contact-state. As for the contact-state between the persons of the same sex, the 2 body parts involved in one occasion of the contact-state were projected upon the same body.

The common feature of all kinds of contact-states, i.e., those between males, between females, and between a male and a female, is that the foot is the body part most frequently involved in the contact-state. The fact that the extremities of the body are most apt to be in contact with another person might be a too natural result derived from the human body structure and sitting posture. However, the thigh is the 2nd most frequent part involved in the contact-state between persons of the same sex, while the shank is the 2nd most frequent part to come in contact between sexes. This difference does not suggest that, which part of the body is involved in the contact-state is merely an incidental phenomenon to the human body structure and sitting posture, but that it is closely related to the basic attitude of the San toward bodily involvement with others. In other words, when one is involved in unintentional or passive physical contact with a person of the same sex, he or she prefers (or is permitted) to have closer contact, than if the person were of the opposite sex.

## GROOMING BEHAVIOR

In the literature dealing with primate social behavior, grooming behavior has been given much special attention, and is stated as being the behavioral pattern most closely connected with affiliation or tolerance between

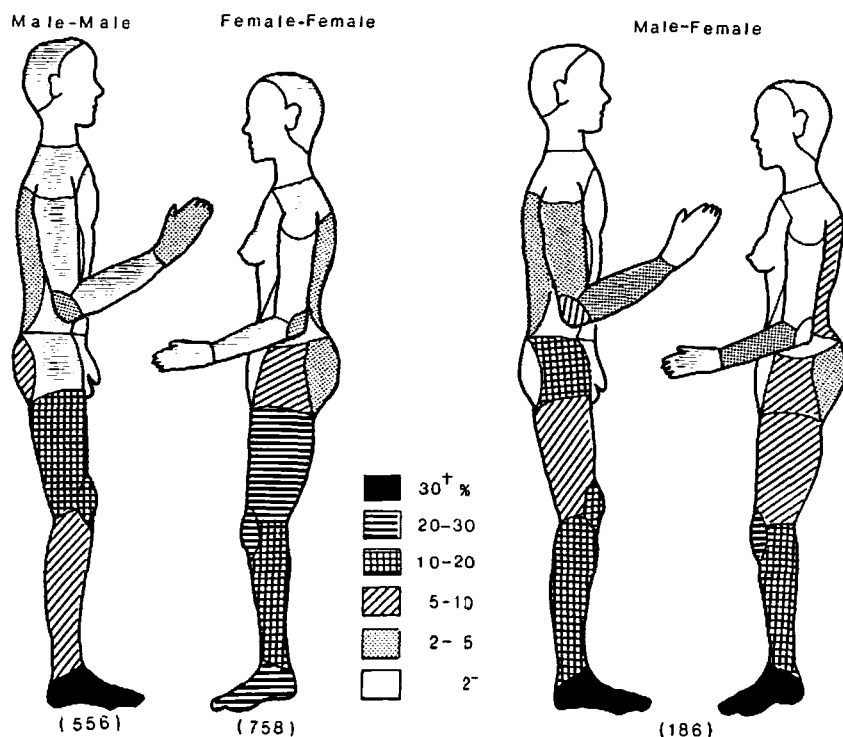


Fig. 10. Relative importance of each body part which was involved in the contact-state between focal individuals and their closest neighbors. The relative importance of each part is represented by the percentages of the number of the observation units for which each part was involved in the contact state to the total number of units for which the contact-state was observed and body parts involved in the contact-state could be confirmed.

individuals. Although few will deny that in the primate order this behavior possibly evolved with the adaptive value of keeping ones coat free of parasites and dirt (Hutchins & Barash, 1976), from more sociological point of view it has been hypothesised that tension-reduction (Sade, 1965) or the establishment of long-term close relationsps (Charmers, 1979) is the primary function of allogrooming among living primates. It is also argued that grooming is benefit-seeking behavior on the part of the groomer who expects future support (mainly in agonistic situation) from the groomee (Seyfarth, 1977).

The most distinctive difference between the grooming behavior of the San and that of non-human primate is the area which is groomed. Among the San grooming is restricted to scalp hair; the loincloth, or the skin covered by it are sometimes groomed, but other parts of the body do not appear to attract the groomer's interest as is ordinarily observed among non-human primates. Therefore there is no doubt that the primary function of this behavior in humans is a hygienic one to pick off the lice and to relieve scalp itch.

However, the joyful enthusiasm shown by the groomer and the intoxicate facial expression of the groomee reveal another aspect of this grooming behavior, which has been properly designated as the "hedonic mode" (Chance & Jolly, 1970). This is possibly the most representative form of contact behavior performed intentionally, and occurs frequently in San public activity. In this section, I will elucidate the social function accompanying grooming behavior, by analyzing, how it is performed, and, who grooms whom.

#### (1) General Characteristics of Grooming Behavior

The following 3 terms are distinguished in order to analyze grooming behavior.

1) Bout: A bout is the behavior performed by one person (groomer) to another (groomee) with sustained attention. The termination of one bout is marked by a definite pause of more than 1 min., the beginning of another kind of activity by the groomer, or the groomer's and/or the groomee's leaving the scene.

2) Episode: An episode is composed of one bout or of 2 or more bouts occurring in series. Even if the groomer or groomee leave the scene, the same episode is continued when this person returns and another bout is initiated between the same dyad. The maximum duration between 2 bouts in series within the same episode was 32 min.

3) Interaction: An interaction is composed of one episode, or of 2 or more episodes which occur simultaneously or in series among 2 or more participants. If persons A and B are simultaneously grooming person C, 2 different episodes, i.e., A->C and B->C, are considered to occur within the same interaction. If person B grooms person A after A has groomed B, 2 different episodes, i.e., A->B and B->A are considered to have occurred in series within the same interaction.

Table 3 shows the number of interactions, episodes, bouts, observed throughout the study period. The alternation of the groomer and the groomee within the same interaction occurred in only 4.3 % (8/184) of the total interactions. Triadic interactions accounted for 7.6 % (14/184) of the total interactions. Of these, a person who was groomed by another person simultaneously groomed the third person (i.e., A->B->C) in only one interaction, while two persons simultaneously groomed the third person (i.e., A->B<-C) in the remaining interactions.

From Table 3 it can be concluded that grooming behavior among the San generally occurs in a form of dyadic and one-way interaction, mainly between the residents of the same camp or of adjacent camps. The pattern of grooming

Table 3. Parameters for grooming interactions

Total number of interactions	184
Number of interactions where groomer-groomee alternations occurred	8 ( 4.3 ) <sup>a</sup>
Number of triadic interactions	14 ( 7.6 ) <sup>a</sup>
Total number of episodes	206
Number of sequential episodes	43 (20.9 ) <sup>b</sup>
Number of episodes in which visitors participated	14 ( 6.8 ) <sup>b</sup>
Total number of bouts	259

<sup>a</sup>The percentage to the total number of interactions (184).

<sup>b</sup>The percentage to the total number of episodes (206).

Table 4. Frequency distribution of episodes and bouts of grooming interactions among 9 kinds of groomer-groomee dyads

Groomer-Groomee	Number of episodes	Episodes percentage	Number of bouts	Bout Percentage
Female-Female	60	29.1	71	27.4
Female-Juvenile	83	40.3	104	40.2
Juvenile-Female	21	10.1	27	10.4
Female-Male	15	7.3	21	8.1
Male-Female	0	0.0	0	0.0
Male-Male	6	2.9	11	4.2
Male-Juvenile	3	1.5	3	1.2
Juvenile-Male	3	1.5	3	1.2
Juvenile-Juvenile	15	7.3	19	7.3
Total	206	100.0	259	100.0

among the San is similar to the pattern found among many primate species in that triadic interactions are very rare<sup>5</sup>. However, among the San, the alternation of the groomer and the groomee within the same interaction is also very rare. In this respect, the grooming pattern of the San differs greatly from the general pattern of grooming among, at least, Macaca and Papio species.

Table 4 shows the frequency distributions of grooming episodes and bouts among the 9 kinds of dyads in which males, females, and juveniles participated as either the groomer or the groomee. Females participated as the groomer in 76.7 % (158/206) of the total episodes, and participated as the groomer or the groomee in 86.9 % (179/206) of the total episodes. On the other hand, males participated as the groomer in only 4.4 % (9/206) of the total episodes. Furthermore, males were never observed to groom females. In other words, grooming behavior among the San is primarily an activity preferentially performed by females, while males are in some way or another inhibited from grooming females.

The duration of bouts is compared between the grooming episodes in which juveniles participated and those in which only adults participated (Fig. 11). In the grooming episodes in which juveniles participated, the mode of the bout duration was 1-5 min., and more than 20 % of the total bouts were those of which the duration was less than 1 min. On the other hand, in the grooming episodes in which only adults participated the mode of bout duration was 5-10 min, and only less than 10 % of the total bouts were those of which the duration was less than 1 min. In contrast, in adult-adult grooming, the bouts continuing for more than 30 min. were sometimes observed. This result demonstrates that grooming bouts between adults tend to continue for longer times than those in which juveniles participate (Kolmogorov-Smirnov test:  $D=0.2129$ ,  $p<0.025$ , two-tailed).

## (2) Grooming Episodes in which Females Participated

As the above section has shown, grooming activity among the San is predominated by females. This section focuses on the grooming episodes in which females participated. Table 5 shows the number of grooming episodes performed or recieved by each of the female residents and semi-residents. The variation among individuals is larger for the numbers of episodes performed by

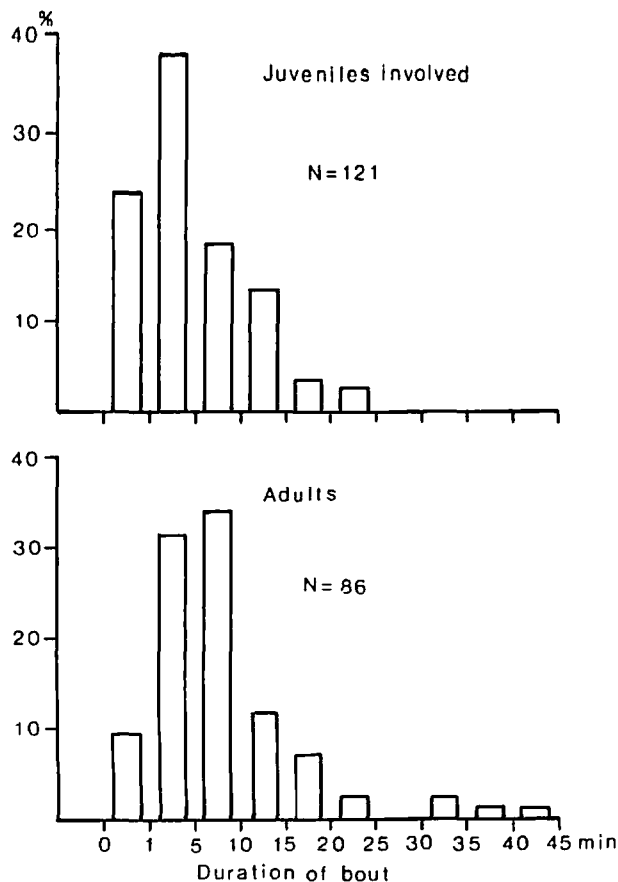


Fig. 11. Histograms of the durations of grooming bouts in which juveniles participated (upper) and in which only adults participated (lower). Only the bouts that were recorded from the initiation to the termination are included.

the females than for those received by them. Even if only grooming between females is examined, the frequencies of becoming the groomer shows larger individual variation than the frequency of becoming the groomee. However, the largest variation among individuals is obtained from the frequencies of grooming episodes toward juveniles. Namely, about a half of the female residents never groomed juveniles, while females such as ga-11 and no-14 show prominently high frequencies of grooming juveniles.

Figure 12 represents: (a) the correlation between the number of episodes in which each female groomed a juvenile and the number of those in which she groomed other females. (b) the correlation between the number of grooming episodes with juveniles and the number of episodes with other females, in which each female participated. Excluding three adolescent females who had no children, there is a high positive correlation between the frequency of grooming juveniles and that of grooming other females ( $r=0.7926$ ,  $p<0.001$ ). Furthermore, a higher correlation was found between the frequency of participating in the grooming with juveniles and the frequency of

Table 5. Number of episodes in which each female was engaged as the groomer or groomee

Name	Grooming toward				Groomed by		
	female	male	juvenile	Total	female	juvenile	Total
to-1	0	0	0	0	1	3	4
be-2	0	0	0	0	4	1	5
go-3	3	0	10	13	6	3	9
ka-4	1	0	0	1	1	2	3
ki-5	0	0	2	2	7	4	11
kk-7	3	0	0	3	1	1	2
kb-8	0	0	0	0	3	1	4
ko-9	4	0	8	12	3	2	5
kg-10	4(3)	7	9	20	0	1	1
ga-11	8	1	21	30	4	0	4
da-12	1(1)	0	1	2	0	0	0
giuka*	1	2	4	7	0	0	0
ha-13	2	2	0	4	3	0	3
no-14	5	0	19	24	8	1	9
kx <sup>2</sup> om*	6	0	4	10	0	0	0
kn-15	2(1)	1	0	3	0	1	1
ks-16	2	0	0	2	3	0	3
km-17	13	2	5	20	6	0	6
gu-18	5	0	0	5	5	1	6
Total	60(5)	15	83	158	55	21	76
Average	3.16	0.78	4.36	8.31	2.89	1.10	4.00
SD	3.1997	1.6408	6.2678	8.8736	2.5317	1.1650	3.0949

Number in parentheses indicates the number of grooming episode toward visitors. Starred females(\*) are semi-residents. One female(ts-6) was excluded from this analysis because she was never observed to be engaged in grooming interactions.

participating in the grooming with other females ( $r=0.8692$ ,  $p<0.001$ ).

These results do not show that San females uniformly participate in grooming activity, but that there is a differentiation among females into 'willing' groomers and 'unwilling' groomers. It has also been shown that the 'willing' groomers tend to frequently participate in both the grooming with juveniles and with females.

The kinship relations between groomers and groomees are examined in the grooming episodes in which females participated. Table 6 shows the kinship relations between both participants in the grooming episodes between females and juveniles. About one-third of the total grooming dyads are mother-child dyads, in which about half of the total grooming episodes occurred. Furthermore in the mother-child dyads more than 3 episodes occurred per dyad, while only one episode occurred per dyad in most other kinship relations. Thus, it can be concluded that the major portion of grooming interactions between females and juveniles, is in the form of maternal behavior primarily consisting of a mothers' care for the hygienic condition of her children.

In spite of the above conclusion, it is misleading to look at even the mothers' grooming toward children only from a hygienic viewpoint. The

Table 6. Kinship relations between groomer and groomee in grooming interactions between females and juveniles

Kinship position	Number of dyads (D)	Dyad percentage	Number of episodes (E)	Episode percentage	E/D
M	18	30.0	55	52.9	3.06
MZ	7	11.6	7	6.6	1.00
FZ	3	5.0	3	2.9	1.00
FM	2	3.3	3	2.9	1.50
(Z)	2	3.3	2	1.9	1.00
Z	1	1.7	1	1.0	1.00
FZD	1	1.7	1	1.0	1.00
FFM	1	1.7	1	1.0	1.00
M(Z)	1	1.7	1	1.0	1.00
MM	1	1.7	1	1.0	1.00
Affinal or non-kins	23	38.3	29	27.8	1.26
Total	60	100.0	104	100.0	1.73

Kinship positions are represented by those from the viewpoint of the juveniles. M: mother, F: father, Z: sister, (Z): half-sister.

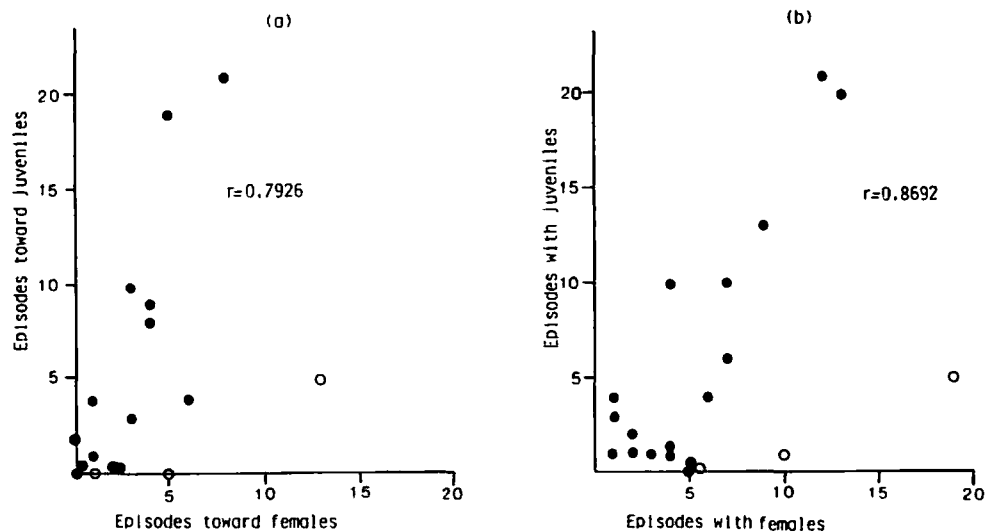


Fig. 12. The correlations between (a) the numbers of grooming episodes in which females groomed juveniles and those in which they groomed other females, and (b) the numbers of episodes with juveniles and those with other females, in which females participated. Black dots and white dots indicate the mature females and adolescent females, respectively. The adolescent females were excluded from the calculation of the correlation coefficient.

function of 'reassurance' or 'soothing' should also be pointed out. In the evening when mothers were going to the borehole to draw water, unweaned infants left in the camp would cry and run after their mothers. Under such condition it was sometimes observed that the mother would briefly groom the head of her child clinging to her legs. Another adult remaining in the camp would then hold the child back after being soothed and quieted by this brief grooming. This is a typical situation in which grooming behavior functions as a form of 'reassurance'.

As for grooming behavior between mature or adolescent females, about 43 % of the total episodes occurred between mother and daughter, sisters, or half-sisters. This result indicates that the closeness of kinship is a main factor which motivates females (Table 7). However, on the other hand, about the same number of episodes occurred between affines or non-kin females. Therefore grooming behavior is also likely to occur as a kind of friendly or sociable transaction between those who have no direct consanguineous tie with each other.

Table 7. Kinship relations between groomer and groomee in grooming interactions between females

Kinship position	Number of dyads (D)	Dyad percentage	Number of episodes (E)	Episode percentage	E/D
M	6	15.3	9	15.0	1.50
Z	5	12.8	13	21.6	2.60
(Z)	2	5.1	4	6.7	2.00
MM	1	2.6	1	1.7	1.00
MDZ	1	2.6	2	3.3	2.00
M(Z)	1	2.6	2	3.3	2.00
MMMZD	1	2.6	1	1.7	1.00
Affinal or non-kins	22	56.4	28	46.7	1.27
Total	39	100.0	60	100.0	1.54

Kinship positions are represented from the viewpoint of the groomee.

Table 8. Age order between groomer and groomee in grooming interactions between females

Groomer	Number of episodes		Number of dyads	
Younger females	44	(73.3)	28	(71.8)
Older females	16	(26.7)	5	(12.8)
Both	-		6	(15.4)
Total	60	(100.0)	39	(100.0)

Figures in parentheses indicate the percentages of the total numbers of episodes or bouts.



Examining the relative age order between groomer and groomee, it was found that more than 70 % (44/60) of the total episodes were performed by younger females toward the older ones. In only 12.8 % (5/39) of the total dyads did the older females play only the role of groomer (Table 8). This result demonstrates well the nature of grooming behavior between females. That is, grooming is usually performed as a 'service' to one's elder.

At the end of this section, grooming behavior by females toward males is briefly touched on. Nearly half of the total (n=15) episodes were performed by one particular female, kg-10 (Table 5). Most of these 7 episodes by kg-10 were observed in an isolated camp at #Kade. Nine episodes (60 %) were those toward the adolescent males. Four episodes were observed to be performed by wives toward their husbands, while mature males other than husbands were groomed in only 2 episodes. In only one episode did a female a male consanguine. In this case the male was the groomer's mother's half-brother.

In summary male-female grooming among the San is characterized by the following 3 points: (a) Males never groom females. (b) Grooming by females toward males is relatively rare, and even in such cases (c) male groomee is restricted to the groomer's husband or adolescent non-consanguines. These points demonstrate that the indulgence in intentional and intimate body contact with the opposite sex is subject to rigorous restriction in the San society. Especially, between the consanguineous males and females intentional contact behavior is strongly avoided at least in public places. The correlation between proximity/contact and kinship relations will be focused on in the following section.

Although most grooming was initiated by the groomer spontaneously pulling the head of the groomee towards oneself without previous invitation, the groomee was sometimes observed to verbally request to be groomed. The following case is not only a peculiar example of grooming initiation by verbal request of a male to a female, but well demonstrates one aspect of the social interaction between male and female in adolescence.

Case 1. 20th January. At noon in the shade of a tree near the field, 4 adult females, 2 adolescent females (km-17 and gu-18), and 4 juveniles are resting, after having cooked and eaten cultivated melons just harvested with other members of Camp VI.

12:38 KT-11 (unmarried adolescent male) approaches this gathering. After greeting and talking with the observer briefly, he sits in front of km-17 at a distance of about 0.8 m.

12:41 km-17 grooms a juvenile.

12:43 KT-11 speaks to km-17, and immediately lies down in front of her, putting his head on her hands. km-17 shrieks cheerfully, but does not seem wholly averse to his action. At last she smiles and lies down prone to KT-11 and begins grooming his head.

12:49 KT-11 gets up and lies down again in the reverse direction. (km-17 again grooms KT-11.) KT-11, closing his eyes, looks very comfortable. The observer takes photograph of this scene.

12:53 Two adolescent males (KI-14 and TB-15) come into this gathering.

12:55 KI-14 asks the observer, "Have you taken a photograph?", and the observer answers, "Yes, I have also taken the photo of KT-11 and km-17". Being surprised to hear this, KT-11 gets up and asks the observer, "When did you take it?". At this point the grooming by km-17 is terminated.

I do not know how the relation between this couple will develop in the future. However, as far as this interaction was concerned, grooming may certainly be functioning as a kind of courtship behavior between adolescent males and females.

## SPATIAL PROXIMITY AND KINSHIP

## (1) Viewpoint and Method

Kinship organization among the Central Kalahari San is undeveloped -- ego applies kinship terminology towards kindreds vertically only within two generations both upward and downward, and laterally within the range of 1st cousins (Tanaka, 1980). Kindred is classified into dichotomous categories of joking and avoidance, and social behavior is differentiated into two systems in accordance with which category the other person belongs to.

From the description by Tanaka (1980) and Silberbauer (1981) the principles for classifying kindreds into two categories of joking and avoidance can be summarized as follows:

- 1) Avoidance relationship is applied to the adjacent generation, except for mother's brother, father's sister, and their spouses.
- 2) Joking relationship is applied to the same generation, except siblings of the opposite sex, parallel cousin of the opposite sex, and their spouses.
- 3) Joking relationship is applied to the persons belonging to the alternate generations. Marshall (1976) reported that Nyae Nyae !Kung in Namibia have developed a specific system such as the homonymous method but have also described practically the same principle for the classification of joking-avoidance relationships as the Central Kalahari San do.

I am not prepared to fundamentally reconsider the concept of the joking-avoidance relationship, important and prevalent within the discipline of social anthropology, from the perspective of bodily interaction. The only thing that I can do in this paper is to examine the correlation between the degree of proximity-contact and kinship relations among the Central Kalahari San. As a matter of course, the denotation of the concepts of 'joking' and 'avoidance', is the extent to which an individual can behave at will in a species-specific social interaction; that is, conversation. However, anthropologists often refer to the aspects of bodily interaction, such as physical contact, proximity, and gaze direction, which corresponds to either of 'joking' or 'avoidance' relationships (Marshall, 1976; Silberbauer, 1981; Matsuzono, 1981). This fact strongly suggests that such a dichotomous system might be, if it actually exists, based on very deep interpersonal attitudes unconsciously expressed at the level of bodily interaction. If so, this system is very likely to be reflected in the quantitative data of proxemics.

In this section, the following 3 analysis methods are adopted:

- 1) It is examined whether proximity within 2 m or bodily contact were observed at least once during focal individual sampling throughout the research period for every possible dyad between all residents over pubescence in Camps V, VI, and VII. Next, these dyads are classified into kinship categories, and the difference in the number of dyads for which proximity or body contact were observed is statistically examined between kinship categories.
- 2) Similarly, the dyads of residents are classified into generational categories, and the difference in the number of dyads for which proximity or body contact were observed is statistically examined between generational categories.
- 3) Focal individuals who were observed for relatively long periods were selected. The individuals are listed as to who was in proximity or contact with focal individuals. Kinship relations between focal individuals and 'frequent neighbors' (i.e., those who were in conspicuously frequent proximity or contact with each focal individual) are examined. Thus the interindividual variation in the list of frequent neighbors is elucidated.

In the following part, the dyads for which proximity within 2 m and body contact occurred at least once will be designated as the 'dyads in proximity' and the 'dyads in contact', respectively. The subject individuals of the

above analyses 1) and 2) includes 16 males and 16 females. One male residents (NS) and 2 female residents (ts-4 and kb-8) are excluded from the analysis, because these residents, frequently absent from their own camp because of visiting or traveling, were rarely observed.

## (2) Kinship Categories and Proximity/Contact

The combinations among 16 males and 16 females are divided into 3 kinds of dyads, i.e., male-male (117 dyads\*6), male-female (256 dyads), and female-female (120 dyads). Each kind of dyad is classified into the following 4 categories of kinship:

- 1) Consanguines: The dyads for which the consanguineous relation were ascertained to exist. Parent-child, siblings (including half-sibling), grandparent-grandchild, uncle/aunt-nephew/niece, etc.
- 2) Primary affines: The dyads of residents between whom the genealogical distance includes only one conjugal linkage. The whole of ego's spouse's consanguines or ego's consanguines' spouses or the whole of consanguines of those spouses.
- 3) Secondary affines: The dyads of residents between whom the genealogical distance includes 2 conjugal linkages. Ego's spouse's consanguines' spouses, and the whole of consanguines of those spouses, etc.
- 4) Non-kins: Affines occupying more distant genealogical position than secondary affines. Namely, the dyads of residents between whom the genealogical distance includes 3 or more conjugal linkages.

If the category of consanguines overlaps with the category of affines, the dyads belonging to both categories are regarded as consanguines, except when the affinal relationship is an immediate 'in-law' relationship between ego and ego's spouse's parents or siblings. In the latter case the dyads belonging to both consanguineous and affinal categories are regarded as primary affines.

Table 9 shows the total numbers of male-male, male-female, and female-female dyads in proximity or in contact in each category. The expected number of dyads in proximity or in contact in each category were calculated according to the percentages of the total number of dyads included by 4 kinship categories. Eleven spouse dyads were excluded from the male-female dyads.

In the male-male dyads, proximity occurs irrespective of kinship categories. Contact is apt to occur among consanguines, and shows a weak tendency not to occur among secondary affines. On the other hand, both proximity and contact is significantly frequent in consanguine female-female dyads ( $X^2=8.4500$ ,  $p<0.01$  for proximity;  $X^2=22.2041$ ,  $p<0.001$  for contact). In contrast, for the female-female dyads belonging to the non-kin category, both contact and proximity is significantly infrequent ( $X^2=5.2246$  for proximity,  $X^2=3.2666$  for contact,  $p<0.05$  for both).

In male-female dyads, almost the same tendency is noted as in the female-female dyads. Namely, both proximity and contact are significantly frequent among consanguines, and very rare among the non-kins. Proximity is also frequent among primary affines.

The above results evidence the following points: males are apt to be proximate with each other irrespective of kinship, while females tend to be proximate with other females of close kin. Between males and females, proximity is also apt to occur among close kin. As for contact, the preference for consanguines is evident even between males.

Next, the kinship relations within the categories of consanguines or primary affines are specified, and the numbers of dyads in proximity or in contact in each kinship relation are compared between male-male, male-female, and female-female dyads (Table 10). As for sibling relations, there is a weak tendency for proximity to occur more often in female-female dyads (sisters) than in male-female dyads (brother-sister) (Fisher exact probability

Table 9. Distribution of the number of dyads for which proximity or contact was observed at least once among kinship categories

Kinship categories	Number of dyads	Dyads in proximity	Dyads in contact
<u>Male-male dyads</u>			
Consanguines	20(17.1)	15(22.1)	14(33.3) <sup>+</sup>
Primary affines	30(25.6)	19(27.9)	12(28.6) <sub>-</sub>
Secondary affines	33(28.2)	18(26.5)	5(11.9) <sub>-</sub>
Non-kins	34(29.1)	16(23.5)	11(26.2)
Total	117(100.0)	68(100.0)	42(100.0)
Significant level( $\chi^2$ )	-	ns(1.9090)	0.02(10.7134)
<u>Male-female dyads</u>			
Consanguines	41(16.7)	29(34.9) <sup>+++</sup>	11(52.4) <sup>+++</sup>
Primary affines	60(24.5)	31(37.3) <sup>+</sup>	7(33.3)
Secondary affines	44(18.0)	11(13.3) <sub>---</sub>	1(4.8) <sub>---</sub>
Non-kins	100(40.8)	12(14.5) <sub>---</sub>	2(9.5) <sub>---</sub>
Total	245(100.0)	83(100.0)	21(100.0)
Significant level( $\chi^2$ )	-	0.001(23.0659)	0.001(40.1115)
<u>Female-female dyads</u>			
Consanguines	16(13.3)	15(27.8) <sup>++</sup>	14(43.8) <sup>+++</sup>
Primary affines	38(31.7)	20(37.0)	9(28.1)
Secondary affines	30(25.0)	12(22.2) <sub>-</sub>	5(15.6) <sub>-</sub>
Non-kins	36(30.0)	7(13.0) <sub>-</sub>	4(12.5) <sub>-</sub>
Total	120(100.0)	54(100.0)	32(100.0)
Significant level( $\chi^2$ )	-	0.01(14.333)	0.001(26.7224)

Figures in parentheses indicate the percentage to the total number in each column. '+' or '-' shows that the observed frequency of dyads in each cell is significantly greater or smaller than the expectation; +++,---:  $p < 0.001$ ; ++,--:  $p < 0.01$ ; +,-:  $p < 0.05$ ;  $df=1$ .

test:  $p=0.1362$  two-tailed). As for the sibling-in-law relations, proximity is more likely to occur in brother-brother-in-law dyads than in brother-sister-in-law dyads ( $p=0.1904$ ). Comparing the uncle-nephew relation with uncle-niece (or aunt-nephew) relation, the ratio of dyads in proximity is very high in both kinds of relations. This high frequency of dyads in proximity might be due to the fact that all of these relations between uncle/aunt and nephew/niece are 'cross' relations (i.e., relations between ego and ego's mother's brother or ego's father's sister). In other words, the principle that the joking relationship is to be applied to the uncle or aunt in 'cross' position, though they are belonging to the adjacent generation to ego's, may be reflected in the above result.

In the following part, contact in various kinship relations will be examined (Table 10(b)). As for sibling relations, the number of dyads in contact is significantly less frequent in male-female dyads (brother-sister) than in male-male dyads (brothers) or female-female dyads (sisters) (Fisher exact probability test:  $p=0.0294$  between brothers and brother-sister;  $p=0.0004$  between sisters and brother-sister, two-tailed). Just the same result is obtained in the sibling-in-law relations. Namely, the number of dyads in contact is significantly less frequent in the dyads of brother-sister-in-law than in those of brothers-in-law or sisters-in-law ( $p=0.021$  between brothers-in-law and brother-sister-in-law;  $p=0.028$  between sisters-in-law and brother-sister-in-law).

Table 10(a). The ratio of dyads for which proximity was observed in close kinship relations

Kinship relation	Male-male	Male-female	Female-female
<u>Consanguines</u>			
Parent	0.80(4/5)	0.77(7/9)	0.83(5/6)
Grandparent	0.00(0/1)	1.00(3/3)	1.00(1/1)
Sibling	0.80(4/5)	0.58(7/12) (<)	1.00(7/7)
Uncle/Aunt	0.71(5/7)	0.80(4/5)	1.00(2/2)
Cross cousin	1.00(2/2)	0.66(4/6)	-
Other consanguines	-	0.66(4/6)	-
<u>Primary affines</u>			
Parent-in-law	1.00(2/2)	0.70(7/10)	0.80(4/5)
Sibling-in-law	0.70(7/10) (>)	0.36(7/19)	0.71(5/7)
Uncle/Aunt-in-law	1.00(5/5)	0.62(5/8)	1.00(2/2)
Cousin-in-law	0.66(2/3)	-	-
Grandparent-in-law	-	1.00(1/1)	0.60(3/5)
Other primary affines	0.30(3/10)	0.50(11/22)	0.31(6/19)

The denominator and numerator in parenthesis indicates the total number of dyads coming under each kinship relation, and the number of dyads in proximity, respectively. (>):  $p < 0.20$ , Fisher exact probability test, two-tailed.

Table 10(b). The ratio of dyads for which contact was observed in close kinship relations

Kinship relation	Male-male	Male-female	Female-female
<u>Consanguines</u>			
Parent	0.80(4/5) (>)	0.22(2/9)	0.66(4/6)
Grandparent	0.00(0/1)	0.33(1/3)	1.00(1/1)
Sibling	0.60(3/5) >	0.00(0/12) <<	0.85(6/7)
Uncle/Aunt	0.71(5/7)	0.80(4/5)	0.00(0/2)
Cross cousin	1.00(2/2)	0.16(1/6)	-
Other consanguines	-	0.50(3/6)	-
<u>Primary affines</u>			
Parent-in-law	0.00(0/2)	0.00(0/10)	0.20(1/5)
Sibling-in-law	0.50(5/10) >	0.05(1/19) <	0.57(4/7)
Uncle/Aunt-in-law	0.80(4/5) (>)	0.25(2/8)	0.50(1/2)
Cousin-in-law	0.00(0/3)	-	-
Grandparent-in-law	-	0.00(0/1)	0.20(1/5)
Other primary affines	0.30(3/10)	0.18(4/22)	0.10(2/19)

(>):  $p < 0.20$ ; >:  $p < 0.05$ ; >>:  $p < 0.01$ ;  
(Fisher exact probability test, two-tailed)

As for parent-child relations, contact is a little more frequent in father-son dyads than in father-daughter or mother-son dyads ( $p = 0.124$ ). Similarly, in uncle-nephew-in-law dyads, contact is a little more frequent than in aunt-nephew or uncle-niece-in-law dyads ( $p = 0.1724$ ).

Comparing the ratio of the dyads in contact with that of the dyads in proximity, it is to be noted that in the dyads of parent-child-in-law contact seldom occurs, irrespectively of sex, in spite of relatively frequent occurrences of proximity.

In summary in comparing close consanguineous or affinal relations, it is evident that contact is far less frequent between the siblings of the opposite sex than between those of the same sex. This is also true for the relations between siblings-in-law (i.e., ego and ego's sibling's spouses or spouse's sibling). Furthermore, a similar but weaker tendency is evident for the number of dyads in proximity. Although the parent-in-law and child-in-law are very often in proximity with each other, physical contact is strongly avoided between them.

### (3) Generation and Proximity/Contact

Generally, it has been accepted that the joking-avoidance relationship is closely related to both sex and generation. Namely, 'reserved' or 'respectful' behavior is required toward the persons of an adjacent upper generation, while relaxed behavior is tolerated toward those of alternate generations. In the above section where correlation between kinship and proximity/contact was examined, it is shown that there was a tendency to avoid being in contact with consanguineous or affinal kins of the opposite sex, but the correlation between the degree of proximity/contact and the generation has not yet been fully clarified. In this section, it will be examined whether there exists significant difference in the number of dyads in proximity or in contact, among the dyads belonging to the same, adjacent, and alternate generations.

Usually some contradiction arises between the relative positions individuals occupy in the genealogy and the absolute age order among them. For instance, in the genealogy of the subject group, kk-7, the eldest daughter of an old woman (be-2), belongs to the same generation as that of unmarried adolescent males such as KI-11, KI-14, and TB-15. Moreover, she belongs to lower generation than that of unmarried adolescent females such as km-15 and gu-16, even though she herself is a mature female (about 40 years old) with 3 children.

Thus in this section the generations induced from the relative positions occupied by the residents in the genealogy are distinguished from the generation based on age grades which were induced from both the age order among them and their physical appearance. The former is designated as the 'genealogical generation' and the latter 'biological generation'. Based on each of the genealogical and biological generation, the dyads of residents are classified into three kinds of generational categories, i.e., the same generation, the adjacent generation, and the alternate generation. When classifying the dyads into biological generation categories, the kinship relations are completely ignored, and all the dyads of residents are included. On the other hand, all male-male dyads are classified into genealogical generation categories, while only the male-female and female-female dyads of consanguines and primary affines are classified into genealogical generation categories. This procedure is induced by the fact that the genealogical distance does not exert strong influence on the occurrence of proximity/contact among male-male dyads while proximity/contact hardly occurs among the male-female or female-female dyads of distant kin. It is also expected that within the range of such close kinship relations as consanguines and primary affines, the San themselves are aware of the genealogical generation irrespectively of absolute age order among them.

Table 11 shows the total number of male-male, male-female, and female-female dyads belonging to each (a) genealogical generation categories and (b) biological generation categories, and the number of dyads in proximity or in

Table 11(a). Distribution of dyads for which proximity or contact was observed at least once among genealogical generations

Generations	Number of dyads	Dyads in proximity	Dyads in contact
<u>Male-male dyads</u>			
Same generation	54( 46.2)	31( 45.6)	19( 45.2)
Adjacent generation	53( 45.3)	32( 47.1)	23( 54.8)
Alternate generation	10( 8.5)	5( 7.3)	0( 0.0)
Total	117(100.0)	68(100.0)	42(100.0)
Significant level( $\chi^2$ )	-	ns(0.1645)	ns(4.4275)
<u>Male-female dyads</u>			
Same generation	43( 42.6)	18( 30.0)	2( 11.1) <sup>-</sup>
Adjacent generation	48( 47.5)	35( 58.3)	14( 77.8)
Alternate generation	10( 9.9)	7( 11.7)	2( 11.1)
Total	101(100.0)	60(100.0)	18(100.0)
Significant level( $\chi^2$ )	-	ns(3.8920)	0.05(7.6783)
<u>Female-female dyads</u>			
Same generation	25( 46.3)	14( 40.0)	11( 47.8)
Adjacent generation	21( 38.9)	17( 48.6)	10( 43.5)
Alternate generation	8( 14.8)	4( 11.4)	2( 8.7)
Total	54(100.0)	35(100.0)	23(100.0)
Significant level( $\chi^2$ )	-	ns(1.4142)	ns(0.7174)

Table 11(b). Distribution of dyads for which proximity or contact was observed at least once among biological generations

Biological generation	Number of dyads	Dyads in proximity	Dyads in contact
<u>Male-male dyads</u>			
Same generation	41( 35.0)	19( 27.9)	15( 35.7)
Adjacent generation	56( 47.9)	36( 52.9)	19( 45.2)
Alternate generation	20( 17.1)	13( 19.2)	8( 19.1)
Total	117(100.0)	68(100.0)	42(100.0)
Significant level( $\chi^2$ )	-	ns(1.5078)	ns(0.1597)
<u>Male-female dyads</u>			
Same generation	82( 33.5)	28( 33.7)	6( 28.6)
Adjacent generation	126( 51.4)	40( 48.2)	7( 33.3)
Alternate generation	37( 15.1)	15( 18.1)	8( 38.1) <sup>++</sup>
Total	245(100.0)	83(100.0)	21(100.0)
Significant level( $\chi^2$ )	-	ns(0.6554)	0.02(8.8391)
<u>Female-female dyads</u>			
Same generation	44( 36.7)	17( 31.5)	9( 28.1)
Adjacent generation	61( 50.8)	32( 59.3)	20( 62.5)
Alternate generation	15( 12.5)	5( 9.2)	3( 9.4)
Total	120(100.0)	54(100.0)	32(100.0)
Significant level( $\chi^2$ )	-	ns(1.6037)	ns(1.7435)

For the symbols '+' and '-', see the notation of Table 9.

contact in respective generation categories. Only for male-female dyads, are significant chi-square values obtained from the distributions of number of dyads in contact among both of the genealogical and biological generation categories. Namely, contact is apt to be avoided between males and females belonging to genealogically the same generation ( $X^2=4.8153$ ,  $p<0.05$ ,  $df=1$ ). At the same time, contact tends to frequently occur between males and females belonging to biologically alternate generations ( $X^2=7.3516$ ,  $p<0.01$ ,  $df=1$ ).

From these results it could not be proven that avoidance toward the adjacent generation, one of the main principles of so-called joking-avoidance relationship, is operating at the level of bodily proximity and contact. In other words, proximity and contact among the San occur, as a whole, almost irrespectively of generation. However, as was demonstrated in the above section, physical contact was strongly avoided between in-laws belonging to adjacent generations. In the following section the examination of individual variation in the kinds of close neighbors will also demonstrate several cases in which a person evidently avoids being in contact with his or her primary affines of adjacent generations. Thus generation difference seems to affect the occurrence of physical contact only between very close affines, but this fact conversely suggests that the generation itself exerts little effect on interpersonal spacing in general. Because the avoidance of parents-in-law is so complex a social phenomenon deeply rooted in the nature of conjugal relationships, it cannot be reduced to only a generational factor.

### (3) Individual Variation in Close Neighbors

In this section the kinds of close neighbors will be examined for those individuals of which the sample sizes are relatively large, elucidating what variation is found in close neighbors among these individuals.

The subjects of this analysis are an old male (KM-4), 4 adult males (NK-5, CH-6, SH-8, KN-9), an old female (go-3), and 4 adult females (ga-11, no-14, da-12, and ha-13). For each individual, the 1st to 5th most frequent neighbors, i.e., those who had appeared more frequently than others within the vicinity (2 m) of each focal individual during all focal sampling sessions, are represented in Figure 13.

First, the variation among males is examined (Fig. 13(a)). The common feature of these 5 males is that all of them have one or more adolescent male as a frequent neighbor. Especially, 2 particular males, KR-12 and HO-13, frequently appeared as close neighbors. Both are non-consanguines to these 5 focal males. Especially the relations between CH-6 and these 2 adolescent males very properly fall under the concept of the 'joking relation'. The following 2 cases are worth describing in detail.

Case 2. 20th November. 15:30 In the shade of a tree in Camp VI, CH-6, ko-9, go-3, and no-14 are sleeping soundly. KR-12 comes, and binds CH-6's left ankle with a skin rope hanging from the branch of the tree. CH-6's knee is forcibly bent in an upright position. CH-6 opens his eyes slightly, but does not condemn this treatment. CH-6's second son (DJ: estimated to be 10-11 years old) seeing this incident smiles with embarrassment. As soon as KR-12 has left, DJ tries to untie the rope from the branch, but he stops this attempt as the rope pulls CH-6's leg. At last DJ stoops over CH-6's feet and loosens his ankle from the rope.

Case 3. 19th December. 15:08 In the shade of a tree in Camp VI, 9 men and 8 juveniles are resting closely together. CH-6 is lying on his right side. HO-13 is lying on his back and sleeping soundly, with his flank in contact with CH-6's. CH-6 begins to fumble around the belly of HO-13, and takes out a tobacco bag which has been put between his shirt and belly. CH-6 hands it over to KR-12 sitting beside, and draws HO-13's shirt down to



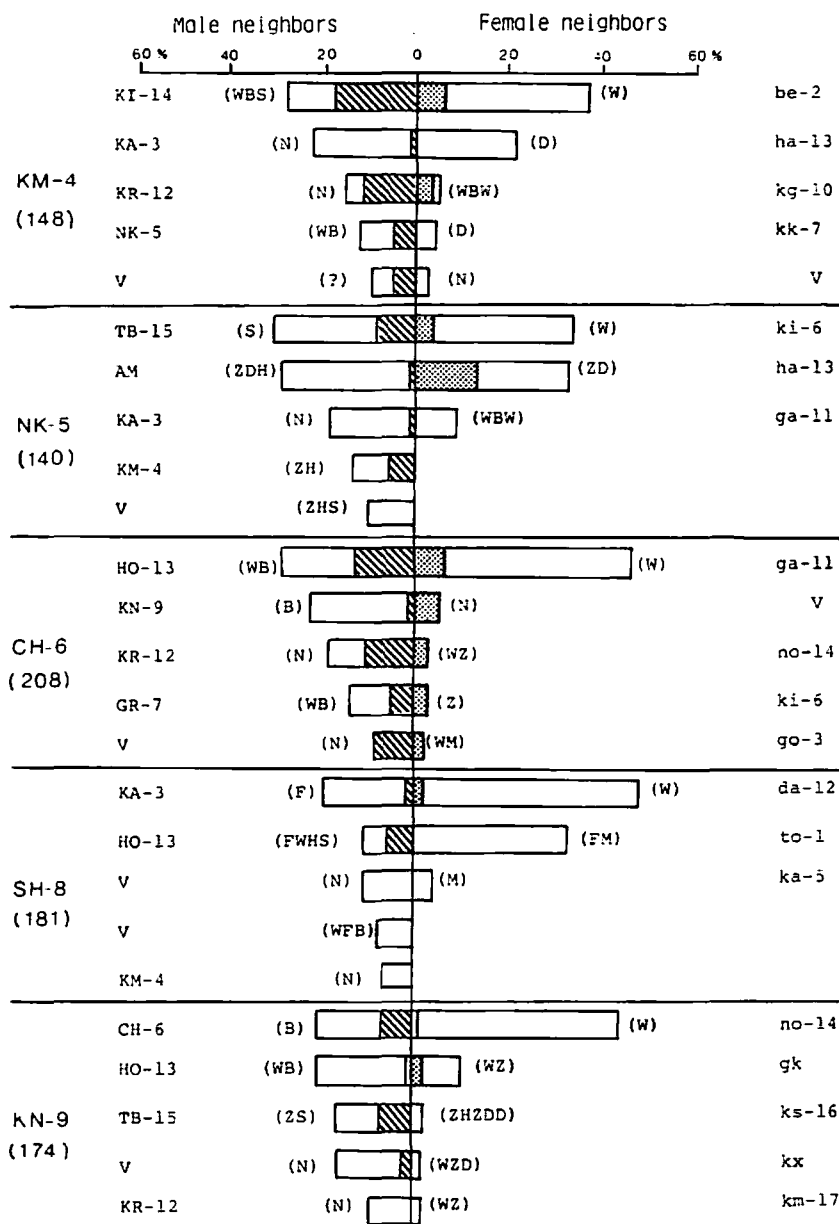
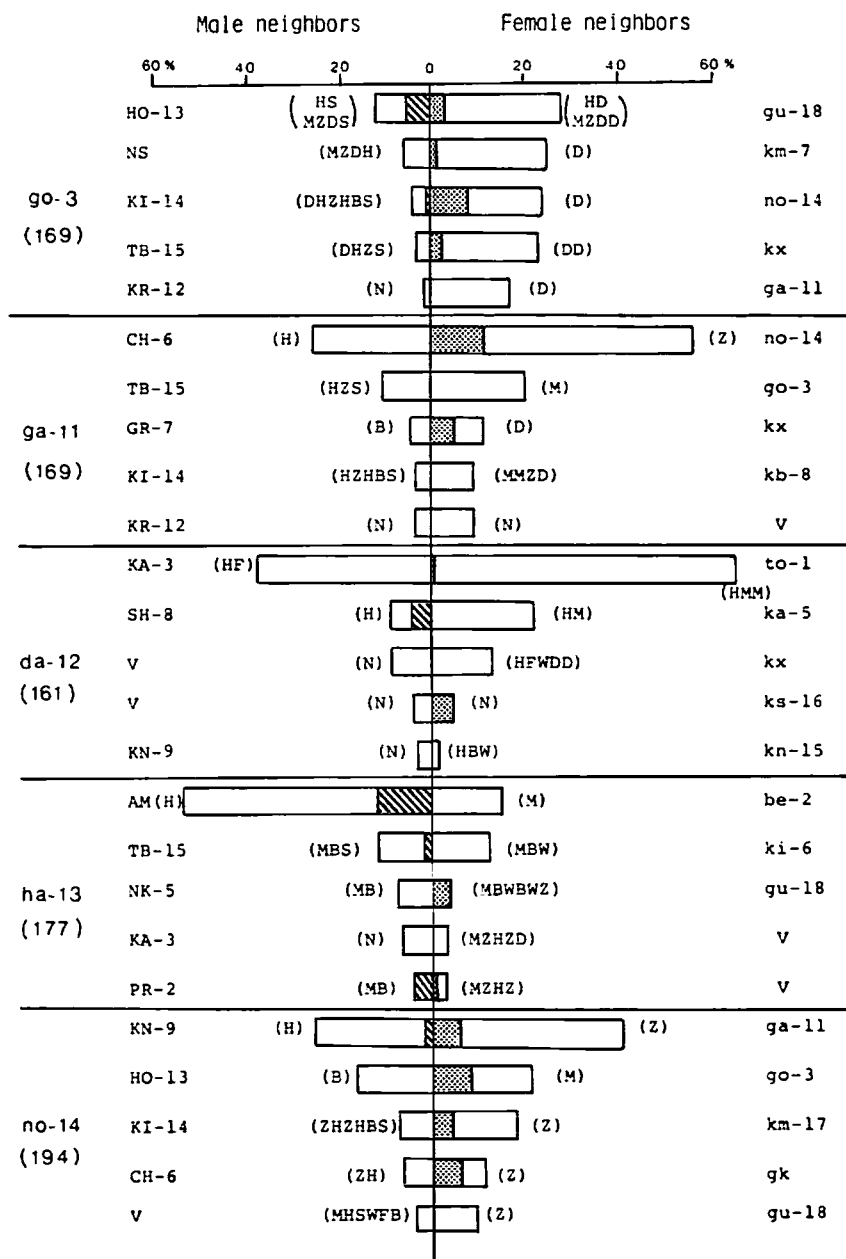


Fig. 13. The 1st to 5th most frequent neighbors for (a) 5 focal males and (b) 5 focal females. White bars and shadowed bars represent the percentages of the observation units for which each neighbor was in proximity (within 2 m), and in physical contact with focal individuals, respectively. Names of focal individuals are given on the left side. Figures in parentheses indicate the numbers of observation units of focal individual sampling. Capital letters in the parentheses indicate the kinship position of each neighbor from the viewpoint of the focal individual. F: father, M: mother, B: brother, Z: sister, S: son, D: daughter, H: husband, W: wife, N: non-kinsmen, V: visitors.



cover his navel. Then CH-6 pats gently HO-13's belly. Still sleeping, HO-13 is unaware of this incident. KN-9 (CH-6's younger brother), who has been sitting in this gathering, fills his pipe.

The list of frequent neighbors for SH-8, a member of an extended family in Camp VII, also attracts special attention. He is an active hunter who often goes out group hunting on horseback. It is to be noted that the major part of his most frequent male neighbors is composed of visitors. Although only the 1st to 5th most frequent neighbors are represented in Fig. 13(a), a total of 17 different men have appeared in his vicinity during the sessions of focal individual sampling. Of these 17 men, 12 (63.2 %) are visitors. Most of these visitors are G//anakwe, which indicates that SH-8, whose wife is also G//anakwe, has close ties with G//anakwe men.

In contrast to this, ha-13, KM-4's daughter and NK-5's niece, married to a G//anakwe man (AN). KM-4 was never in contact with AM, his son-in-law, though he was proximate with AM to some extent (AM is not represented as a frequent neighbor in Figure 13, but is the 6th most frequent neighbor at the rate of 8.8 %). NK-5 was also seldom in contact with AM, though he was frequently proximate with his nephew-in-law. Such rareness of contact between AM and KM-4 or NK-5 seems to reflect the avoiding tendency between persons belonging to genealogically adjacent generations.

In the list of the females with whom these 5 males were frequently proximate, without exception the wives occupy higher ranks. The brothers, CH-6 and KN-9, residents of Camp VI among which matrilineal relative linkages are predominant, show quite low frequencies of proximity with females other than their own wives. In contrast, the residents of Camp V and VII (KM-4, NK-5, and SH-8), among which patrilineal linkages are predominant, have particular female consanguines with whom they are frequently proximate. In this point, it is to be noted that NK-5 is frequently in contact with his niece (half-sister's daughter; ha-13) while KM-4 is never in contact with his daughter.

The 5 women are compared with each other in figure 13(b). During the sessions of focal individual sampling for the elder female, go-3, the 2nd wife of KA-3 usually living in the adjacent camp (Camp VII), her husband never appeared in her vicinity. This may be a bias which is due to the small sample size. An adult female, da-12, also shows low frequency of proximity with her husband (SH-8). This is due to the fact that SH-8 was often absent from his camp, going to hunt on horseback.

Generally, husbands contribute a lesser percentage to frequent neighbors of females than the percentages for males to which wives contribute. One of the reasons might be that males are apt to be absent from the camp, for hunting or gathering, for longer periods than are females. In fact, AM, ha-13's husband, being usually engaged in manufacture work in camp, showed quite a high frequency of proximity with his wife even in the list of male neighbors for ha-13.

Examining female frequent neighbors for these 5 females, most of the frequent neighbors for the residents of Camp VI (go-13, ga-11, no-14) are very close consanguines. this result strongly reflects the composition of this camp in which matrilineal linkages predominate. In contrast, the list of close neighbors for da-12, a resident of Camp VII, shows a specific tendency. Although she is very frequently in proximity with her parents-in-law and grandmother-in-law, she is almost never in contact with them. This might also be due to the general tendency of avoiding one's elder primary affines.

Summarizing the above results, it is concluded that the kind of persons most likely to appear in the vicinity of each individual is primarily determined by the composition of the camp in which he or she resides. Especially, within the camp where matrilineal linkages predominate, an extreme concentration of female consanguines tends to be formed. Although wives and

husbands are frequently in proximity with each other, the percentage of husbands as frequent neighbors for wives is generally less than the percentage of wives to the frequent neighbors of husbands. The distinctive feature of proximity/contact among males is that adolescent males frequently appear as partners in proximity/contact with the elder and adult males. Lastly, special attention should be paid to the phenomenon that physical contact is strongly avoided between consanguines of opposite sexes, or between the primary affines (irrespective of the sex), belonging to adjacent generations, in spite of the high frequency of proximity occurring in these combinations.

## DISCUSSION

### (1) The Nuclear Family and Proxemics

According to our ethnocentric common sense, close proximity and the physical contact would be considered most likely to occur among the members of a nuclear family. Among the San the family is also a definite social and economic unit capable of being self-sufficient when necessary (Tanaka, 1980). The observation on a single family in the isolation phase strongly suggests that the family is also the unit within which the proximity and the contact preferentially occur. Namely, even through life in the isolated camp composed of only 7 persons, an adolescent male, the only non-member of the nuclear family, was far less frequently in close proximity or physical contact with family members than they were with each other. Even in such isolated life, the outsider of the nuclear family keenly perceived his position and kept interpersonal space between him and the members of the nuclear family.

The fact that the mother-wife position is the focus of the proximity/contact relationship within the nuclear family might not be surprising, if we remember that the first and the most intimate proximity contact relation with others that the human being experiences is that with his or her own mother. However, it is to be noted that the mother is not only the partner on which young children are dependent. She also maintains very close position with her adolescent son or the adolescent affinal kinsman outside the nuclear family. In so far as this case is concerned, there is little evidence of the rule which make the mother and these adolescent men avoid being in close proximity and contact with each other. In this point, the interpersonal spacing in the isolated camp is in clear contrast with that of larger camps composed of several families where the tendency for men and women to segregate from each other was evident.

On the other hand, the father maintains rather long distance from adolescent kinsmen, and has the mother-wife as his closest partner. This fact might be too naturally deduced from the nature of the conjugal relationship. However, it should be confirmed as an essential feature of the proxemic behavior within the San family that the San have no rules restricting the chance of being in close proximity or contact with one's spouse in public places, both in the isolation and aggregation phase.

Comparing the characteristics of proxemic behavior within the San family with those within our own families what feature is unique to the San? Roughly speaking, so far as proxemic behavior is concerned, the configuration of the San family does not overthrow the conventional understanding of our own families based on everyday life experiences. I must confess that the observation of family life in the isolated camp reminded me of the terms such as 'intimacy' or 'affection' usually stereotyping the psychological bond which is supposed to integrate the ideal 'family'. In this sense, the mode of the San family in the isolating phase might be relatively easily understood by contemporary Japanese who are apt to conceive the 'nuclear family' as a closed group (Hara, 1983).

However, from the long-term point of view, the San family differs greatly from the Western modern family whose ideal form is based on the lifelong bond between a male and a female. Among the San, polygyny, sexual intercourse outside of marriage, divorce, and remarriage occur at a rather high rate (Tanaka, 1980; in prep.). Moreover, studying the mother-infant interaction among the !Kung San, Konner (1976) argues that several characteristics of the maternal behavior of the !Kung prompt faster neuromotor development of the infant, than that of the modern Euro-American infant. In order to clarify the characteristics of family for the Central Kalahari San, it is required to accumulate more elaborated and extensive observations on both aspects of sex and infant development.

## (2) Economic Division of Labor between the Sexes and Sexual Differentiation of Behavior

It has been widely accepted that the differentiation of the economic role into hunting by males and gathering by females is not only the most primitive form of the human division of labor but also one of the most necessary conditions for the formation of the human family (e.g. Imanishi, 1960; Jolly, 1972). However, in various societies, the male role and the female role are greatly differentiated from each other in various aspects other than the economic division of labor. Other than the roles intentionally performed, sexual differentiations are found at the level of microscopic body motion (Birdwhistell, 1970; Kendon, 1973). Among the Central Kalahari San, sexual differentiation was also observed in sitting posture. This point will be fully described elsewhere.

The fact that females preferentially perform grooming behavior can be regarded as an example of the role differentiation according to sex in aspects other than the immediate economic division of labor. In the following part of this section, it will be discussed how to comprehend role differentiation between both sexes, in the performance of grooming behavior. As the first point, about a half of the total grooming episodes between females and juveniles occurred between mothers and their own children. Therefore, it can be assumed that grooming behavior originates from maternal behavior, i.e., the maternal care of the children comparable to breast feeding or removing excrement. If this is true, grooming behavior can be regarded as a kind of housework and a part of the economic division of labor in the broadest sense.

On the other hand, the grooming between adult or adolescent females showed the following several distinctive features: (a) it tends to continue longer than juveniles participant grooming, (b) it frequently occurs between affinal or non-kin females as well as between consanguines, and (c) it tends to be performed by younger females toward elder females. In other words, in female-female grooming, the sociable function is more prominent than the hygienic one. It can be conceived of as a kind of 'service' behavior based on respect for the elder. However, it is surmised that females are prompted to groom other females by basically the same motivation as when they groom juveniles, because there is a high correlation between the frequencies of participating in both kinds of grooming episodes. Thus it is concluded that this specific pattern of intentional contact behavior originally was a part of the housework allocated to the mothers, and has been organized into a social transaction between adult females beyond the framework of the economic division of labor.

Another important clue to the meaning of grooming behavior can be gained by focusing on the pleasure underlying the experience of searching another's body or of having one's own body searched by others. The San, both the groomer and the groomee, are often enthusiastically absorbed in this behavior. The groomer pleasantly brings her face close to the head of the groomee and carefully inspects the hair. The groomee, with closed eyes and a rapt

expression, emit sharp fricative sounds made by the tongue and teeth, similar to the dental click, just as the groomer flattens lice -- I do not know whether this sound expresses pain or pleasure. In the cultures of so-called developed countries it would be difficult to find such body-searching behavior in public comparable to that of the grooming behavior among the San. In our country, only a few examples, such as 'ear-cleaning', 'patting on the shoulder' performed within the nuclear family, or 'brushing one's partner's hair in turn'; sometimes observed among pubescent girls, include something similar to grooming behavior. Nomura (1983) refers to a description by a European historian that, 'picking-off-the-lice' was a very common habit in traditional European societies such as French mountain villages in the 14th century. Also in this case, it was usually females who performed this behavior. In our country 'picking-off-the-lice' also had been a very common habit, but it has rapidly vanished for the last few decades with the improvement of hygienic condition. There have been regrettably few systematic descriptions of such familiar face-to-face interactions.

Probably the sexual caress is the most representative of contact behavior toward another's body, performed between adults in contemporary industrial societies. Moreover the sexual caress is accompanied with role differentiation between the sexes; contrastive to grooming among the San, in that it is predominantly performed by males toward the 'erogenous zone' of the females' body. Non-sexual contact behavior such as grooming obviously differs from the sexual caress in both its motivation and its interactional pattern. However, it would be too hasty to regard grooming and sexual caress as two completely unrelated bodily phenomena, making a sharp distinction between them. If we assume that the pleasure of searching another's body and being searched by others is essential to the human species, it is very probable that apparently 'non-sexual' contact behavior could be easily intermingled with sexual contact within the experience of each individual. This might be a reason why apparently 'non-sexual' behavior must be subject to the social regulation.

Among San society, grooming behavior between males and females is very rare, and especially males never groom females. This fact implies that non-sexual body-searching behavior can easily become the analogy of the sexual caress. The above issue might be also relevant to the fact that the "body manipulator", i.e., fumbling or manipulating one's own body parts, is regarded as an impoliteness and restrained in public in Western societies (Ekman, 1977).

### (3) Segregation between Males and Females

The most distinctive feature of interpersonal spacing among the Central Kalahari San which has been elucidated by the analysis of quantitative data in this paper, is the segregation between males and females. The analysis of focal individual samples has shown not only that proximity with the opposite sex is far less frequent than with the same sex, but that individuals of the opposite sex other than one's spouse tends to be proximate with the focal individual at rather long distances of 1-2 m. In terms of proxemic behavior, the correlation between 'avoidance' and 'generation' has not been confirmed, but the analysis of the correlation between kinship and the occurrence of proximity/contact has demonstrated that both proximity and contact were strongly avoided between siblings or siblings-in-law of the opposite sex within the same generation.

As the first factor prompting segregation between males and females, the economic division of labor between the sexes should be pointed out. In San society, monosexual groups are apt to be formed because males and females usually participate in separate kinds of economic activity. However, even if males and females are intermingled with each other within the same grouping,

each sex tends to form monosexual cluster within it. In addition, frequent proximity observed between spouses makes it difficult to consider the prevalent tendency of spatial segregation between males and females as the result of only the economic sexual division of labor.

It has often been pointed out that the joking-avoidance relationship is correlated with the incest taboo (e.g. Tanaka, 1980). But the result that, although the proximity/contact is relatively rare between opposite sexes other than spouses, it occurs significantly frequently among consanguines is contradictory to the assumption that the avoidance relation is applied to the pair for which the incestuous intercourse is probable to occur. Moreover, the fact that contact is avoided between siblings-in-law of the opposite sexes as well as between brothers and sisters cannot be explained by the incest taboo, because intercourse between siblings-in-law can never become incestuous. In fact, in San society there are several cases of polygyny with sisters, which proves that the sibling-in-law of the opposite sex is the person with whom the sexual intercourse is not inhibited. Therefore the rareness of proximity/contact between males and females among the San is not the result of the regulation based on the incest taboo; which permits one to be in proximity or in contact with probable partners for sexual intercourse and restrains the individual from being with those for whom intercourse is impossible. Rather it is due to a more inclusive principle that makes any male and female avoid being in proximity and in contact with each other.

Segregation between males and females is most typically observed among the Mbuti Pygmy, hunters in the tropical rain forest of Zaïre. According to Ichikawa (1978), Mbuti men spend most of the time after coming back from hunting until going to bed, in the central part of the camp ('tele'), while women spend this time in front of their respective huts arranged on the circumference of the camp. Such spatial arrangement segregating men from women represents the conflict between the patrilineal band principle and the family principle; reflecting the basic structure of the Mbuti patrilocal band.

The analysis of organization of the residential group revealed that the sedentary camps at !Koi!kom are bilaterally organized (Tanaka et al., unpub.). Therefore, segregation between males and females within the Central Kalahari San social group, of which the formation is based on bilaterality, cannot be interpreted as the reflection of the basic structure of the patrilocal band. However, some aspects of proximity/contact among the Central Kalahari San suggests conflict between male and female principles, which is comparable with the case of the Mbuti Pygmy. Namely, males tend to be proximate with each other irrespectively of their kinship relation, while females show a conspicuous tendency to be close to consanguines of the same sex. Originally the hunting activity of San males was a solitary task, but the cooperation of several men has been required in order to butcher big game and bring the meat back to camp. The present group-hunting on horseback requires male cooperation on a larger scale than was necessary in the past. The necessity of cooperation among males might be a factor influencing the grouping of non-consanguineous males. Below two factors which cause segregation between males and females will be referred to.

First factor is a general tendency to feel more comfortable in interactions with the same sex. The tendency to be proximate with the same sex is distinctively noted in our own culture. Various kinds of social pressure such as role differentiation in the industrial society and parental training during childhood, are at work in the tendency to be close to members of the same sex in the public place; found even in the younger generation Japanese. On the other hand, in San society men and women are not allocated 'occupations' predominantly connected with their sex, nor are women subordinate to men in an economic sense. Far from that, in terms of caloric value, women contribute more largely than men to the subsistence basis (Tanaka, 1980; Lee, 1979). Comparing play behavior between London and San

children, Blurton-Jones and Konner (1973) have shown that London boys tend to play with boys rather than girls while San girls prefer boys to girls as their playmates. They have also pointed out that London girls are less attractive playmates for boys because their activity is lower than San girls. These results suggest that the social pressure encouraging children to play and contact with the same sex is not as serious in San society as it is in European societies. Therefore, the strong attraction to the same sex among adult San, suggests that such attraction is not specific to industrial societies where both economic and social differentiation according to sex are rigorously institutionalized, but rather is derived from older origins.

As a matter of course, monosexual aggregation in daytime public place is just one side of the whole sexual arrangement among the San. Another side is the close association with a specific person of the opposite sex in the dark private space of the night. Harris (1980) mentions as one of the biopsychological constants of the human species that, "people are highly sexed and generally find reinforcing pleasure from sexual intercourse --- more often from heterosexual intercourse" (p. 63). In addition to this clause, we might have to say that people find deeper comfort in the transaction with the same sex persons in public, corresponding to the extent to which they "find reinforcing pleasure from sexual intercourse" with the opposite sex.

Another clue to understanding the segregation between males and females among the Central Kalahari San is provided by considering it in terms of the avoidance of sexual competition. Tanaka (in prep.) analyzes the long-term transitions of conjugal relationships and describes various cases of the development of sexual relations outside marriage among the San in the #Kade area. Sexual relations outside of marriage is called 'za:ku'. Tanaka (1980) describes a case of 'za:ku' which involved two married couples in a sort of mate-swap.

Among San society, adultery not only causes conflict between husband and wife but is usually subject to blame or ridicule by public opinion (Tanaka, personal comm.). However, because no legal sanction is imposed against adultery, San society creates a high potential for sexual relationships outside of marriage to develop. The avoidance of proximity or contact with the opposite sex other than one's spouse can be understood as a means of guarding oneself from being exposed to such potential. In other words, segregation between males and females might be rooted in the concern for the possibility of incurring suspicion or jealousy of other residents, and to cause social conflict which would result in a disruption of the camp. It was confirmed that physical contact was apt to be avoided between males and females belonging to the same genealogical generation, while it tends to frequently occur between males and females of biologically alternate generation. This result supports the above hypothesis, because the former is the male-female combination for which a sexual relationship is most probable to develop, while the latter is the combination for which intercourse is least probable to occur.

Lastly it should be pointed out that the ideological world of the San affects spacing between males and females. Silberbauer mentions that the G/wikwe believe that invisible slivers containing evil forces shower down on the band from the sky and lodge in the women's body. From women evil diffuses through the band (Silberbauer, 1981: p. 54). I have also heard almost the same story from a G//anakwe informant belonging to a relatively younger generation. Marshall (1976: p. 249) also mentions the belief of the !Kung San that, "if the genitalia of a man were to touch a spot on the ground that a woman's genitalia had touched, ... his prowess as a hunter would be destroyed".

However, the meaning attached by the actor to the usually unintentional way of handling one's own body in the presence of others is not always based on accurate socio-ethological cause and effect of the body. It has been often



argued that human reality is ambiguous and multi-layered. Among others, the bodily reality is the source of ambiguity which ultimately confronts any attempt to order it by language. In this discussion I have proposed several directions for understanding the phenomena of spatial proximity and bodily contact among the San. They are only as much a part of the various possibilities to comprehend bodily reality as is the ideological world attached by the San themselves to their own bodily existence. Even so, man is the only being that not only attaches significance to its own bodily existence by means of language, but can even distort this bodily reality according to the significance thus produced. Therefore, the positivistic or 'etic' approach adopted in this paper, based on quantitative data on the proxemic behavior, has somehow to be related to the significance, or 'emic' view, produced by those who are involved in their own bodily reality. In order to achieve this purpose, another investigation on the face-to-face interaction itself among the San is required; including both verbal and non-verbal aspects.

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#### NOTES

- \*1 This 'affluence' in Camp VII is probably due to the fact that the wife of SH-8, da-12, is the daughter of a man who possesses the most goats in the #Kade area.
- \*2 The eldest daughter of PR-2 is an adult female who has been widowed and lived in another camp.

- \*3 All the members of household E except NK-5 had lived with household D in this isolated camp, and used another hut. Just before I joined this camp, everyone but TB-15 came back to !Koi!kom (see Fig. 3) and the hut of E was taken down several days later.
- \*4 The accurate time proportion of the physical contact can not be read from Figures 7-9 in the above section. This is because only one individual was sometimes found in the vicinity of the focal individual at the point of measuring, and because 2 individuals were sometimes simultaneously in contact with the focal individual.
- \*5 So far as I have observed Japanese macaques and baboons, most of the grooming interactions among them were dyadic. (e.g., Sugawara, 1980; 1982). However, it is often observed for pygmy chimpanzees or common chimpanzees that 3 or more individuals simultaneously groom one another. (Kitamura, personal comm.).
- \*6 All combinations of the 16 males represent 120 dyads, but 3 males, AM, KR-12, and HO-13, had never been measured as focal individuals. Therefore the combinations among these 3 individuals cannot be observed. Thus these 3 dyads are excluded from the analysis.

## REFERENCES

- Altmann, J., 1974. Observational study of behaviour: sampling methods. Behaviour, 49.
- Birdwhistell, R.L., 1970. Kinesics and Context: Essays on Body Motion Communication. Univ. of Pennsylvania Press, Pennsylvania.
- Blurton Jones, N., 1975. Ethology, anthropology, and childhood, In R. Fox (ed.), Biosocial Anthropology. Malaby Press, London.
- \_\_\_\_\_, & Konner, M.J., 1973. Sex differences in behaviour of London and Bushman children. In R.P. Michael & J.H. Crook (eds.), Comparative Ecology and Behaviour of Primates, Academic Press, London.
- Burgess, J.W., 1983. Interpersonal spacing behavior between surrounding nearest neighbors reflects both familiarity and environmental density. Ethology & Sociobiology, 4 (1).
- Chalmers, N., 1979. Social Behaviour in Primates. Edward Arnold, London.
- Chance, M.R.A., & Jolly, C.J., 1970. Social Groups of Monkeys, Apes, and Men. Thames and Hudson, London.
- Childers, G., Stanley, J. & Rick, K., 1982. Government Settlement or People's Community?: A Study of Local Institutions in Ghanzi District, Applied Research Unit, Ministry of Local Government and Lands, Republic of Botswana, Gaborone.
- Draper, P., 1976. Social and economic constraints on child life among the !Kung. In R.B. Lee & I. DeVore (eds.), Kalahari Hunter-Gatherers: Studies of the !Kung San and Their Neighbors, Harvard Univ. Press, Massachusetts.
- \_\_\_\_\_, 1978. The learning environment for aggression and anti-social behavior among the !Kung. In A. Montagu (ed.), Learning Non-Aggression, Oxford Univ. Press, London.
- Eible-Eibesfeldt, I., 1972. Die !Ko-Buschmann-Gesellschaft: Aggressionskontrolle und Gruppenbindung, Monographien zur Humanethologie 1, Munchen.
- \_\_\_\_\_, 1974. The myth of the aggression-free hunter and gatherer society. In R. Holloway (ed.), Primate Aggression, Territoriality and Xenophobia: A Comparative Perspective, Academic Press, London.
- Ekman, P., 1977. Biological and cultural contributions to body and facial movement. In J. Blacking (ed.), The Anthropology of the Body, Academic Press, London.
- Goffman, E., 1959. The Presentation of Self in Everyday Life. Doubleday, New York.

- Hall, E.T., 1966. The Hidden Dimension. Doubleday, New York.
- Hara, H., 1983. Jinrui shakai ni totte kazoku wa fuhun ka (Is the family universal to the human societies ?). Gendai no Esupuri Bessatsu: Kazoku towa Katei towa, Vol. 3, Shobunka to kazoku, Shibundo, Tokyo. (in Japanese).
- Harris, M., 1980. Cultural Materialism: The Struggle for a Science of Culture, Random House, New York.
- Hutchins, M. & Barash, D., 1976. Grooming in primates: implications for its utilitarian function. Primates Vol. 17.
- Ichikawa, M., 1978. The residential groups of the Mbuti Pygmies. Senri Ethnological Studies 1, Africa 1.
- Imanishi, K., 1960. The origin of human family. Jap. J. Ecol. 25.
- Jolly, A., 1972. The Evolution of Primate Behavior, Macmillan, New York.
- Kendon, A., 1973. A description of some human greetings. In R.P. Michael & J.H. Crook (eds.), Comparative Ecology and Behaviour of Primates, Academic Press, London.
- \_\_\_\_\_, 1982. The organization of behavior in face-to-face interaction: observations on the development of methodology. In K.R. Scherer & P. Ekman (eds.), Handbook of Methods in Nonverbal Behavior Research, Cambridge Univ. Press, London.
- Konner, M.J., 1976. Maternal care, infant behavior and development among the !Kung. In R.B. Lee & I. DeVore (eds.), Kalahari Hunter-Gatherers: Studies of the !Kung San and Their Neighbors, Harvard Univ. Press, Cambridge, Massachusetts.
- Lee, R.B., 1968. What hunters do for a living, or, how to make out on scarce resources. In R.B. Lee & I. DeVore (eds.), Man the Hunter, Aldine, Chicago.
- \_\_\_\_\_, 1979. The !Kung San: Men, Women, and Work in a Foraging Society. Cambridge Univ. Press, London.
- \_\_\_\_\_, & DeVore, I., 1968. Problems in the study of hunters and gatherers. In R.B. Lee & I. DeVore (eds.), Man the Hunter, Aldine, Chicago.
- Lévi-Strauss, C., 1967. Structural Anthropology. Doubleday, New York.
- Marshall, L., 1976. The !Kung of Nyae Nyae. Harvard Univ. Press, Cambridge, Massachusetts.
- Matsuzono, M., 1981. Adjacent generations and respect attitudes among the Gusii. In N. Nagashima (ed.), Themes in Socio-Cultural Ideas and Behaviour among the Six Ethnic Groups of Kenya.
- Nomura, M., 1983. Shigusa no Sekai: Shintai Hyogen no Minzokugaku (The World of Gesture: Ethnology of Bodily Expression) Nippon Hoso Kyokai, Tokyo. (in Japanese).
- Sade, D.S., 1965. Some aspects of parent-offspring relations in a group of rhesus monkeys, with a discussion of grooming. Am. J. Phys. Anthropol., Vol. 23.
- Seyfarth, R.M., 1977. A model of social grooming among adult female monkeys. J. Theor. Biol., 65.
- Silberbauer, G.B., 1972. The G/wi Bushmen. In M.G. Bicchieri (ed.) Hunters and Gatherers Today, Holt, Rinehart & Winston, New York.
- \_\_\_\_\_, 1981. Hunter and Habitat in the Central Kalahari Desert. Cambridge Univ. Press, London.
- Sugawara, K., 1980. Nihonzaru hanareosu no shakaiteki deai no kozo (Structure of social encounters among the non-troop males of the Japanese monkey). Kikan Jinruigaku, 11(1). (in Japanese)
- \_\_\_\_\_, 1982. Sociological comparison between two wild groups of anubis-hamadryas hybrid baboons. African Study Monographs, Vol. 2.
- Takahata, Y., 1982. Social relations between adult males and females of Japanese monkeys in Arashiyama B troop. Primates, 23(1).
- Tanaka, J., 1971. Busshuman: Seitaijinruigaku teki Kenkyu (The Bushmen: A Study of Ecological Anthropology). Shisakusha, Tokyo. (in Japanese).

- \_\_\_\_\_, 1976. Subsistence ecology of Central Kalahari San. In R.B. Lee & I. DeVore (eds.), Kalahari Hunter-Gatherers: Studies of the !Kung San and Their Neighbors, Harvard Univ. Press, Massachusetts.
- \_\_\_\_\_, 1978. Sabaku no Karyudo (Hunters in the Desert). Chuokoronsha, Tokyo. (in Japanese).
- \_\_\_\_\_, 1980. The San, Hunter-Gatherer of the Kalahari: A Study in Ecological Anthropology. Univ. of Tokyo Press, Tokyo.
- \_\_\_\_\_, 1983. Bunka henka no katei (The Process of acculturation). Gekkan Minpaku, 6. (in Japanese).
- \_\_\_\_\_, Sugawara, K., & Osaki, M., unpublished. Report of the San Investigation Carried Out during 1982-1983. (Report to the Government of Republic of Botswana).